







1910. As the figures show, the best output was reached toward the end of its long campaign. The checkers were only changed once.

From the results shown above it is clear that the use of the changeable ports allows the efficiency of the open hearth plant to be increased and the monthly output to be held on a very steady basis. The full advantage of such practice is self-evident and cannot be put into figures. In order that the best results may be obtained, it is of course necessary sometimes to make changes to meet local conditions and to become used to the new method of working.

G. B. W.

### Dodge Pulleys for Exacting Service

The Dodge Mfg. Company, Mishawaka, Ind., through its Southern branch, 28 South Forsyth street, Atlanta, Ga., has closed a deal with the Georgia Railway & Power Company, Gainesville, Ga., for a large iron center wood rim pulley, which will transmit 125 hp. at 225 r.p.m. under normal conditions. The pulley will be used on a water-wheel shaft. To provide against accident, should the waterwheel race, the pulley will be made of special design to withstand a rim speed of two miles per minute. The Dodge Company makes a specialty of these pulleys.

A short time ago a customer ordered a Dodge iron spider wood rim pulley, 46½-in. diameter, 16-in. face, 4-in. bore, to be tested for a rim travel of 9000 ft. per minute. In entering the order the Dodge Company also arranged to make an exact duplicate. The rims of both were made from the same lot of lumber and the spiders were cast from the same ladle of metal. They were as nearly identical as it was possible to make them. The pulley for the customer was tested to a rim speed exceeding 10,000 ft. per min., and shipped. Then began operations for testing the duplicate. A vacant room at the factory was fitted with a lineshaft driven by transmission from the main jackshaft. The lineshaft was arranged to run 200 r.p.m., and driven by belt to countershaft, thence to the testing arbor on which the pulley was mounted. A strong barricade was erected and the test was made at the noon hour, when the main engine was available for varying speeds. The engine was started slowly and gradually increased to its maximum speed of 75 r.p.m. According to the test readings taken, this produced an actual speed on the testing mandrel of slightly over 2400 r.p.m. This multiplied by 146, being the circumference in inches of the 46½-in. pulley, showed that the wheel had actually run at the terrific speed of 29,200 ft., or a little over five and one-half miles, rim travel per minute.

### Germany's September Exports

Germany's exports of iron and steel in September amounted to 502,551 metric tons, which compares with 466,141 tons in August and 433,500 tons in September, 1911. The exports were the heaviest of the year, with the exception of June. The following table shows the export movement for September and for the first nine months of the year for the most important products, as compared with 1911, stated in metric tons:

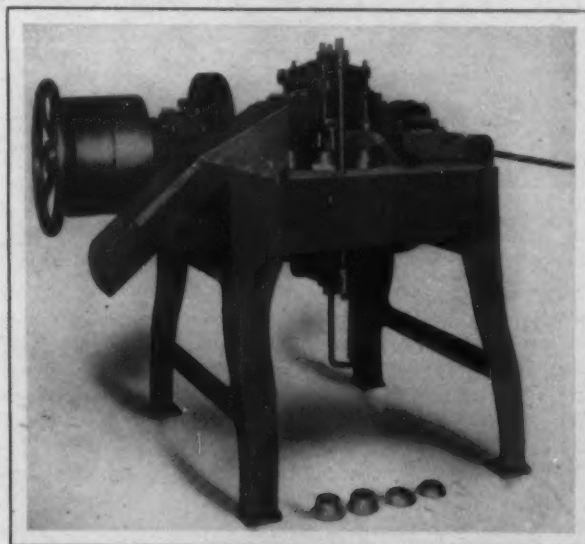
	September		Nine months	
	1911	1912	1911	1912
Pig iron .....	61,646	90,074	567,287	787,833
Scraps .....	14,547	13,060	130,606	110,969
Blooms, billets, etc. ....	46,948	51,828	471,233	491,413
Beams .....	32,698	45,408	294,702	362,685
Other structural forms ....	59,855	74,548	570,677	616,141
Heavy plates .....	22,412	24,660	217,188	215,689
Light plates .....	9,132	8,963	79,516	82,252
Wire, unpolished .....	20,151	25,795	181,455	201,098
Wire, polished .....	13,434	12,078	105,291	113,449
Wire nails .....	3,967	4,430	43,789	39,142
Wrought pipe .....	15,893	14,627	107,717	122,475
Steel rails .....	44,615	44,691	389,307	390,343
Ties .....	9,060	12,675	98,576	131,148

South Africa now boasts an iron industry. The local supply of scrap is being worked into bar iron and small angles by the Union Steel & Iron Works, whose plant is located between Boksburg and Benoni, on the Rand, South Africa. Another company, known as the Union Steel Corporation of South Africa, is building a similar rolling mill at Vereeniging, on the Vaal River. Consul Edwin N. Gung'aulus, Johannesburg, states that this company has a 16-year contract for the purchase of all of the scrap iron and steel produced by the Government railroads at \$4.86 per ton.

### Automatic Trimming and Curling Machine

For trimming and curling the flanges of cups drawn from sheet metal, the E. W. Bliss Company, 11 Adams street, Brooklyn, N. Y., has recently designed and built a special machine. It is semi-automatic in operation, it being simply necessary for the operator to place the cup on the chuck and the rest of the operation is performed without any further attention. The capacity is approximately 30,000 cups in a 10-hr. day. Either straight, taper or spherical shells having a maximum diameter of 3-in. and a maximum height of 1½ in. can be handled.

Essentially the machine consists of a vertical turret and six spindles, each of which carries a chuck. The revolution of the spindles is continuous through spur gearing, while the turrets are intermittently revolved by



A Special Automatic Machine for Trimming and Curling the Flanges of Drawn Cups Built by the E. W. Bliss Company, Brooklyn, N. Y.

a Geneva movement. As a chuck appears in front of the operator he places a cup upon it, after which the chuck moves into position for the trimming cutters to act. These are driven by a chain and sprockets and consist of two rotary cutters mounted on a slide which moves by a cam action toward the chuck to trim the flange of the cup, the scrap being discharged through the machine. In the next two positions, the curling of the edge is done. This is started in the first position and finished in the second. While these operations are being performed the blank is held on the chuck by an upper spindle which descends upon the blank and clamps it after it has been brought into position. After the blank has been trimmed and curled, it is discharged by two fingers mounted in a yoke which are set to the diameter of the blank and held against a stop by spring pressure. These fingers descend upon the cup, gripping at the edge, and raise it until it is struck by a third one which throws it in a horizontal direction into the discharge chute.

Factory inspection and law enforcement, a discussion of immediate federal legislative programme and the matter of the minimum wage are features of the sixth annual meeting of the American Association for Labor Legislation, to be held in Boston, Friday and Saturday, December 27 and 28, at the Hotel Copley Plaza. Copies of the programme can undoubtedly be obtained by applying to the secretary, John B. Andrews, 131 East Twenty-third street, New York City.

J. H. Williams & Co., manufacturers of drop forgings, Brooklyn, N. Y., having found it desirable to arrange for the more convenient service of their customers in the Middle West, have opened an office and warehouse at 40 South Clinton street, Chicago, in charge of Charles E. Hathaway, who has represented them in Chicago for some years. It will be the aim to carry at all times a stock of their many drop forged specialties sufficient to accommodate the immediate needs of their customers.

# Adopting Piece Work and Premium Systems\*

## The Conditions Favorable to Piece Work —What to Consider in Establishing Rates —Observations on the Physically Fit Man

BY STUART DEAN

Piece work or the premium system is applicable to any work that can be thoroughly inspected. It is not suited to the assembling of fine work, but is all right for the assembling of the rougher classes of machinery where the designer has allowed ample leeway for poor workmanship, where the customer pays a low price, and where a perfect machine is not absolutely essential. The output per man in a plant changing from day work to piece or premium work will increase in the ratio of three to five.

### When Piece Work Is Not Advisable

Piece work or premium work can be used on the machine operations of the automobile engine. All pieces can be gauged and inspected as they come from the machines. Piece or premium work cannot be used without danger of a bad product on the assembling work, because thorough inspection here is impossible. An assembler can screw a stud carefully into the hole that has been partially stripped and the job will pass the inspection and the running test. When the buyer tries to tighten down the nut on this stud, on account of a leak, the thread will be stripped.

An assembler discovering that he has not placed enough liners or shims between the connecting-rod and the cap to prevent the pinching of the crank, may leave these bolts loose rather than waste his premium time in correcting the matter. The engine will pass all tests, but give trouble afterward.

The ground bearing of the valve on its seat may be broad on one side and narrow on the other, and still be tight and pass the test. This valve will not stay tight as long a time as one that has an even bearing all around.

Inspection will not discover faults in assembling. The workman must be depended on to do good work.

### Eliminating False Moves

To get the most out of piece work, both for the workman and the firm—for the workman a higher total wage, and for the firm a lower piece rate—every false move, no matter how seemingly insignificant, must be absolutely eliminated. This can be done to some extent by the workman, but can be accomplished better by having an intelligent overseer stand by the man while at work and call the man's attention to each one of his false moves. A good way is to have the man count aloud the number of movements he makes. He will soon be interested in the possibility of reducing this number.

The molder in the foundry making small molds, may be putting one too many shovelfuls of sand on his mold which afterward has to be struck off as superfluous. In striking off the mold he may make two moves where one long sweeping move would do the work.

### Setting the Time on a Piece

When a man is able to do the task without making any false moves, time him. See that he is moving rapidly, that is, not holding back because you are timing him. From his time on one piece figure what his output would be for a day. The actual output will drop below this on account of small delays now and then. The allowance will be different on different classes of work. On work requiring very little physical effort, the allowance will be

small. On work taking great physical effort, this allowance should be as high as 40 per cent. That is, a man will have to rest 40 per cent. of the time on the heaviest work. His resting generally takes the form of working slowly in the afternoon when he is tired, and quitting work rather early.

For instance, set the molding rates as follows on small molding after getting the true time of one mold when the molder is hurrying:  $2\frac{1}{2}$  minute mold add 40 per cent.; total time  $3\frac{1}{2}$  minutes; 5 minute mold add 40 per cent.; total time 7 minutes;  $7\frac{1}{2}$  minute mold add 40 per cent.; total time  $10\frac{1}{2}$  minutes; 10 minute mold add 40 per cent.; total time 14 minutes.

On heavy piece work or premium tasks be sure to use a powerful man—a man physically fit for the work. There are men who never tire. The only effect enormous, continued physical effort has on them is to make them ravenously hungry. The energy expended is taken from the food the man eats and not from the man's tissue. He is burning food, not flesh.

I remember asking a workman who was doing very heavy work all day if he felt tired at night. He was a muscular, short, thick set man. He said, "No, I feel just as fresh at night after I have eaten my supper as when I started in the morning." He was physically fit for the task and felt no injurious effect from overwork. Few realize what an enormous amount of work the physically fit man can do.

A fireman on a big locomotive puts 15 tons of coal through an 18-in. door upon the fire in a run of five or six hours. At the Lake Erie docks men are paid 18 cents per ton for cleaning up the ore in the hold of an ore boat after the automatic unloader has handled all that it can (80 per cent. of the cargo). They have made as high as \$12 per day of ten hours, which means 6.67 tons of ore were shoveled in one hour.

On straight work, not cleaning up, they are paid 13 cents per ton. When eight men are in a hold shoveling into 1-ton buckets each man handles five or six tons of ore per hour. A rate of eight tons per hour has been reached. The daily wages run as high as \$6.50 to \$7.80 per day.

These are instances of the ability of the physically fit man for heavy work.

When skilled mechanics, in any trade, are paid \$3.25 for ten hours, the piece worker will earn \$4 to \$4.50 a day; the exceptional man will be able to make about \$5. These figures are for work where the piece rate has been correctly set. The workman must keep up a good speed all day to make the money.

### Handling Work by the Specialist System

Where work can be specialized by having a man do but one or two operations, costs can be greatly reduced. This system of specialization increases the output per man and improves the quality of the product, because each specialist is an expert on his one particular part of the work. A product made exactly to the drawings will result, because interchangeability is a necessity to the system.

A firm can easily increase its force of skilled workmen, even when labor is scarce, for it is easy to break in green men who can be taught to do one or two operations only. Never make the mistake of putting a skilled mechanic on this simple work; it will be distasteful to him, and he will not be successful at it.

\*Copyright, 1912, by Stuart Dean. Ninth article on Shop and Foundry Management.



## Lake Iron Ore Shipments for 1912

Total by Lake, 47,444,000 Tons—New  
Northern Pacific Dock at Superior

DULUTH, MINN., November 30, 1912.—Latest figures from the various railroad docks, covering iron ore shipments by lake for the year as below. Though these may be changed by a few thousand tons they are substantially accurate as a final total:

	1912 Gross tons
Duluth, Missabe & Northern (Duluth).....	10,505,577
Duluth & Iron Range (Two Harbors).....	9,370,970
Great Northern (Superior).....	13,936,899
Soo Line (Superior).....	305,000
Lake Superior & Ishpeming (Marquette).....	2,224,217
Duluth, South Shore & Atlantic (Marquette).....	1,054,085
Chicago & Northwestern (Ashland).....	3,776,500
Soo Line (Ashland).....	1,018,788
Chicago & Northwestern (Escanaba).....	4,050,190
Chicago, Milwaukee & St. Paul (Escanaba).....	1,202,600
	47,444,826

To this must be added whatever all-rail shipments are made direct to furnaces, which may be heavier than usual. Docks are left unusually clean of ore, the lake season ceased during good weather and did not drag on in freezing cold as is sometimes the case. The fall has been especially favorable for traffic, which continued in great volume to the very last.

Some vessel owners expect to maintain their ships in commission for two weeks, taking grain and coal, and many vessels will be utilized as grain storage during the winter, either at the head of the lakes or at Buffalo, so that the fleet will be a trifle late in commencing the ore business next spring. High grain freights late in the year have been of material assistance to vessel owners, who have not made much money out of ore this year. Rates of 40 cents from the head of the lake and of 25 cents from Escanaba have not conduced to net earnings.

### Northern Pacific Dock at Superior

It is planned by the Northern Pacific Railway to erect this winter a small steel and concrete iron ore shipping pier, similar in design to the latest dock erected by the Great Northern, at Superior, Wis. It will be a short pier, with capacity for the handling of about 1,000,000 tons a year, and it will be some years before that capacity will be required. The road has lands on the Cuyuna range and has some traffic contracts that may amount to not far from 100,000 tons in 1913 and more later. The Soo line, which handled 300,000 tons over its Cuyuna range shipping pier this year, will increase capacity in the expectation of moving the tonnage of several additional mines in 1913. It is understood that one of the Cuyuna range properties, mining a mangiferous ore of 55 to 60 per cent. combined iron and manganese, has sold 200,000 tons to be delivered over a period of two years, the sales being to two large interests making spiegeleisen. Two other mangiferous mines are being developed in that vicinity, from either of which small shipments can be looked for in the coming season.

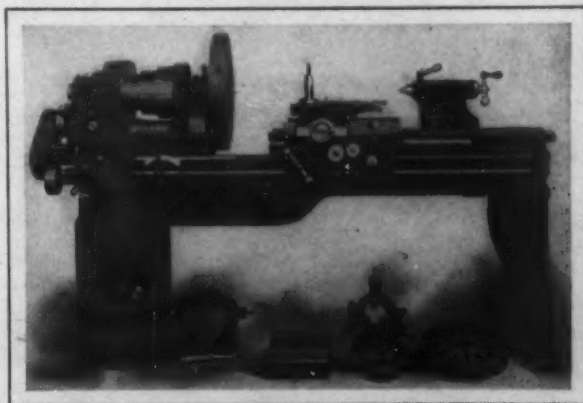
The Meriden Iron Company, of Virginia, Mesaba range, erected this year a log washery in the top of its shaft house. It has been mining a low grade silicious ore that it has been able to pass through this washing plant successfully. Just now it is in trouble with the city and property owners, for it is mining under the town. It has given an indemnity bond to protect the municipality and has been granted the right to continue mining, but property owners have asked for an injunction to prevent it from caving the streets adjacent to their property and the property itself, although the company controls mineral rights to the lands in question. The case will be decided very soon.

The coal deposits of this country, according to the United States Geological Survey, furnish so large a supply that it is equivalent to 4000 times the present annual rate of exhaustion. Although the total mined to the close of 1911 was 8,739,572,427 net tons, it is estimated that over 99.5 per cent. of the original supply remains to be mined.

## A 21-In. Gap Bed Engine Lathe

An engine lathe having a swing of 21 in. and capable of accommodating work  $6\frac{1}{2}$  in. wide in front of the faceplate in the gap has been brought out by the Willard Machine & Tool Company, Cincinnati, Ohio. The lathe is designed to serve the double purpose of the jobbing and the manufacturing shop. By removing the filling piece in the bed, work 21 in. in diameter with a  $6\frac{1}{2}$ -in. face can be operated on in the gap and by replacing the filler the lathe is transformed into a regular standard engine tool, having the rigidity of lathes of the latter class. The headstock is massive with a bearing of  $21\frac{1}{2}$  in. on the bed, and the spindle is of 0.60 per cent. carbon crucible steel. The front journal is  $2\frac{3}{4}$  in. in diameter and the bearings are of phosphor bronze scraped to fit the spindle.

The carriage has a bearing  $18\frac{1}{2}$  in. long on the V's and the bridge is  $7\frac{3}{4}$  in. wide with a dial for screw cutting. The compound rest is made large to add to the rigidity.



A New Gap Bed Engine Lathe with a Swing of 21 In. and a Gap of  $6\frac{1}{2}$  In. Built by the Willard Machine & Tool Company, Cincinnati, Ohio

A feature of the apron is that it is cast in one piece, making it stiff and strong and all holes are tapped and reamed in a jig. The crank handle for moving the carriage is at the left side of the apron, an unusual position in gap bed lathes. As this handle is usually moved to the right side of the apron its location on the left side, it is felt, makes it very convenient for the operator. To stiffen the carriage when it overhangs the gap, a gib is attached to it at the right side of the apron.

The removable filling piece is finished by scraping to obtain a perfect fit. It transforms the tool into an engine lathe with a  $13\frac{1}{2}$ -in. swing, that is identically the same as the company's regular standard 13-in. engine lathe illustrated in *The Iron Age*, August 25, 1910. Three lengths of bed, 6, 7 and 10 ft. respectively, are furnished. The equipment of the lathe includes a cabinet leg under the headstock, an extra large faceplate and the filling piece for the gap.

In spite of the decrease in the production of iron, says W. T. Thom, of the United States Geological Survey, the value of the total mineral production of the United States for 1911 reached the enormous total of \$1,918,184,384. Of this the value of the metals was \$672,179,600, the remainder representing the non-metals. Coal led the list, with a value of \$626,366,876; pig iron was second, with a value of \$327,334,624; clay products third, \$162,236,181; copper fourth, \$137,154,092, and petroleum fifth, \$134,044,752. While the total value for 1911 is about \$70,000,000 less than for 1910, it is greater than that of any other year except the banner year of 1907, when the \$2,000,000,000 mark was passed.

The Hausman & Wimmer Company, iron and steel scrap, 111 to 115 Second avenue, Pittsburgh, Pa., has purchased the entire scrap iron plant of A. Epstein at 1640 to 1646 Orleans street, Detroit, Mich., and will run it as a branch of the Pittsburgh business.

The Canton Iron & Steel Company, Baltimore, Md., is preparing to start its rolling mill, which has long been idle. The plant will be ready for operation about the middle of December.

# Influence of Pouring on Quality of Steel

## A Study of Ingot Defects, Their Origin and Their Effect Upon Steel Rolled Into Plates—How to Avoid Blowholes

Dr. C. Canaris, steel works superintendent at the Schulz-Knaut plant near Duisburg, Germany, recently prepared a paper on "The Influence of Pouring on the Quality of Low Carbon Steel," an abstract of which appears in *Stahl und Eisen*. While he wrote of conditions at the above plant, Dr. Canaris's article has a good deal of matter of general interest. It relates entirely to plate steel, and to ingots that are rolled directly into plate and not into slabs in an intermediate mill. Bottom pouring alone is used.

It is pointed out that incorrect handling during pouring can ruin the best material and cause the ingots to suffer from the following defects:

1. Shrinkage cavities.
2. Contraction cavities.
3. Excessive segregation.
4. Large blowholes.
5. Blowholes near the surface.
6. Scabbiness and scales.

These defects influence the plates rolled from the ingots, sometimes to a very great degree. For instance, the cavities give laminations which may penetrate a long distance, requiring much shearing in order to have solid steel left. Excessive segregation often causes the plates to crack when being worked up. Ingots with large blowholes give unsound plates, and those with blowholes near the surface give pitted steel, both kinds being totally useless in most cases. The bad effects of scabs are well known.

Proper pouring and handling of the steel has also a great influence on the output of the rolling mill, and therefore on the efficiency of the plant. For instance, if a 70 per cent. output can be increased to 73 per cent. with proper care, in a mill rolling 100,000 tons of ingots per year, and it is assumed that the difference between the price of plates and scrap is \$15, then the increase in value is \$45,000 in the year, or about 60c. per ton of finished product. There is also the advantage that the output of the mill can be increased without enlarging the plant, and the amount of scrap is decreased. The six defects are taken up in detail below, together with their causes and the means to be taken to obviate them.

### 1 and 2.—Shrinkage and Contraction Cavities

By shrinkage is meant the decrease in volume when the steel passes from the liquid to the solid state, and by contraction that which takes place as the solid metal cools from the end of the freezing to lower temperatures. The process when a mold is filled with steel is briefly as follows: A solid crust quickly forms around the walls and the bottom. This is followed by others and the solidification takes place in this way. The shrinkage is taken up by the liquid interior in the early stages, but after awhile the top freezes over and a hollow place begins to form in the ingot because there is not enough liquid steel present. It usually takes the shape of an inverted funnel, and is known as the pipe. After the freezing, contraction begins, the ingot draws together, shortens in length and pulls away from the wall of the mold. The pipe is reduced in dimension, due to the drawing together of its walls.

#### LOWER TEMPERATURE, LESS PIPING

It has been established that the size of the pipe decreases considerably with lowering of the initial temperature. This is very important, for by pouring at the lowest possible temperature the formation of the pipe is greatly prevented. Slow pouring has naturally the same effect, for as the steel slowly rises in the molds a great deal of heat is lost by radiation. The shrinkage can also be neutralized in low carbon steel by the formation of blowholes. As is well known, liquid steel can dissolve gases which are evolved during solidification. The first layers of steel to solidify are free from blowholes because the gas finds free passage through the still liquid steel. As the metal solidifies, however, blowholes form. They neutralize the shrinkage, in some cases altogether prevent it, and greatly reduce the

size of the pipe. Under ordinary conditions the blowholes are small, with pure metallic surfaces, and weld together during rolling.

Details are given of the methods used by Dr. Canaris to produce pipe-free ingots of sizes varying from 16¼ x 8¼ in. at the base to 59½ x 22 in., and 882 lb. weight up to 28,660 lb. A number of the ingots were cut open in order to determine directly the size of the pipe, but in most cases its size was judged by the length of lamination that had to be sheared away. A certain amount of lamination is caused by rolling, but if it exceeds 2 to 5¼ in., depending on the thickness of the plate, then it is tolerably certain that it is due to the pipe.

#### DETAILS REQUIRING CARE

The results of the tests carried out emphasize the importance of having the ingot molds smooth and straight on the inside. Otherwise uniform shrinkage and contraction will be impossible and the formation of the pipe favored. For the same reason the molds must be at as uniform a temperature as possible. The kind and arrangement of the runner bricks is of the greatest importance. The steel must rise in all the molds uniformly. If this is not the case, then it will rise too quickly in some of the molds, and this favors pipe formation. Also at the completion of pouring an equalization takes place, and the steel tries to flow from molds where it is at a high level to others where it is lower. This causes suction cavities, which often extend the whole length of the ingot and make the resulting plate altogether useless.

This important point is further developed in the paper, particularly with regard to the number of different sized molds to be filled from one pouring funnel, and the proper placing of the molds over the openings in the runner bricks. These bricks must be carefully laid so as to give a free passage to the steel. The size of the nozzle used in the pouring ladle must also be chosen to bring about pouring that is neither too fast nor too slow. The author recommends one of 20 m.m. (0.78 in.) original diameter.

#### INGOT PLATES TO REDUCE PIPE

When the molds are filled within about 4 in. of the desired height, the rate of pouring must be reduced to allow equalization. As soon as the proper height is reached the pouring must be stopped. The surface of the steel, especially with very low carbon heats, usually sinks a little in the molds. The pouring is then resumed until the surface is again even. This is repeated several times until freezing has begun in the separate molds and a crust has formed about 1 in. to 1½ in. wide. Then ingots weighing less than 1 ton should be immediately covered with their plates. Gas evolution is still taking place and is not completely prevented by laying on the plate. The pressure thereby produced in the interior of the ingot will either close the pipe or very greatly reduce it in size. This is confirmed by the results given in the following table:

Heat	Ingot	Weight, lb.	Thickness of plate, in.	Length of lamination, in.	Covered
373	1	1863	0.39	25.6	Late
	2	1863	0.39	27.6	Late
	3	1863	0.39	11.8	Early
	4	1863	0.39	7.9	Early
539	5	1565	0.49	11.8	Early
	6	1565	0.49	9.8	Early
	7	1565	0.49	27.6	Late
	8	1565	0.49	29.5	Late
191	9	2315	0.57	32.4	Late
	10	2315	0.57	37.4	Late
	11	2315	0.57	39.4	Late
	12	2315	0.57	15.7	Early

With ingots weighing more than a ton large pipes often occur notwithstanding the observance of the above precautions. A further procedure in the case of such ingots is to top pour a little steel into them directly from the ladle after the completion of the bottom pouring and the formation of a crust, then immediately to cover them with their plates. This process is logical, according to the theory of pipe formation, and is regularly followed by Dr. Canaris with excellent results. The precautions and methods recommended to avoid piping are summed up below:



1. Correct condition of the ingot molds.
2. Uniform temperature of the molds.
3. Proper design of the pouring brick.
4. Careful laying of the pouring and runner brick.
5. Careful placing of the pouring funnel and ingot molds.
6. Slow pouring.
7. Repeated pouring, after the completion of the pouring proper, to maintain the level of the steel in the molds.
8. Early covering of the ingots with ingot plates.
9. A small amount of top pouring after the completion of bottom pouring.

### 3.—Segregation

Owing to the greater fusibility of the segregate during its formation it has a tendency to rise in the ingot and is assisted by the gases which are being continuously evolved. For this reason the greatest segregation is found near the top of the ingots, and its bad effects are well known. Segregation cannot be prevented by modifications in the pouring, so that all that can be done is to aid the natural endeavor of the segregate to rise in the ingot, in order that it can be sheared away together with the laminated part. This is brought about by slow pouring and keeping the top of the ingot hot. In other words, the same methods used to prevent the pipe formation must be used in this case, except that the early laying on of the plate is not recommended, as it hinders the evolution of gas, which helps to sweep the segregate toward the top. On the other hand, pouring a little hot steel on the top of the ingot is very good, as is self evident. Through the use of these precautions the bad influence of segregation can be greatly lessened. Experience shows, however, that shearing away the laminated part is not always sufficient to remove the segregate. Very often the greatest segregation is below the deepest part of the pipe, so that an apparently sound and good part of the plate must be sheared and scrapped.

### 4.—Large Blowholes

Under ordinary conditions the large number of blowholes found in soft steel ingots are generally small and do not show in the finished plate. They have either been completely welded up or else their walls have been pressed together very strongly. Large blowholes, however, can be caused by improper handling of the metal during pouring, and are not removed during rolling. According to Ledebur they are caused by the presence of foreign materials. For instance, if a small piece of loose runner brick comes in contact with the rising stream of liquid steel, it brings about a sudden cooling of the steel immediately around it. This cooling causes an evolution of gas, and in this way the blowhole is formed. It sticks to the foreign substance and is prevented from rising. If the foreign material consists of oxide of iron then the evolution of gas is especially active because carbon monoxide is formed.

Large blowholes can also be caused by air that is sucked down by the stream of steel during pouring and cannot escape. If they are large, their walls do not weld together during rolling, and blisters appear in the finished plate or else are seen after annealing or during the further working of the steel. The parts showing this appearance must be sheared away, so that in this respect also a lowering in output is caused.

If these large blowholes are to be avoided then the molds must be cleaned very carefully. After every cast the walls are covered with a layer of oxide of iron, and this, together with any other material, must be removed and the molds covered with a thin graphite wash. Naturally this must be done before they are placed in position over the runner bricks. Further, these bricks should be cleaned and the openings blown out with hand bellows.

Top pouring should not be used under any circumstances, because as the stream strikes the stool little globules of metal fly off against the walls of the mold. They quickly freeze, are covered with a layer of oxide, and give rise to blowholes as mentioned above. A great deal of air is also sucked down into the steel along with the descending stream, which cannot escape, as it is prevented by the incoming metal. Bottom pouring avoids these evils and the escape of the gas is favored. The following methods therefore must be used to avoid large blowholes.

1. Very careful cleaning of the molds outside the casting pit.

2. Cleaning of the built-up pouring plates and blowing out of the runner brick channels.
3. Avoidance of top pouring.

### 5.—Blowholes Near the Surface

Under ordinary conditions a crust of completely sound material forms on the walls of the ingot. This is only the case, however, if the metal is so thinly liquid that the first gas evolved can easily penetrate it, and if the evolution is not too active. As soon as the metal becomes viscous, for any reason, then the free passage of the gas is prevented. The uppermost layers, which quickly lose a great deal of heat by radiation, are viscous toward the end of pouring and do not allow the gas to pass. This causes a great pressure in the interior of the ingots, which presses back the gas evolved near the ingot walls. A section of such an ingot shows a series of blowholes tightly pressed together just beneath the surface, their long axis perpendicular to the ingot walls. The interior of the ingot is usually free from blowholes. If these blowholes only occur locally they may be due to the presence of foreign matter, as mentioned before.

Such ingots give bad plate. The thin outer skin is burnt off in the soaking pits and slag penetrates the blowholes. The finished plate is then completely covered with pits and is known as pitted steel. It must be cut up and scrapped. In so far as this can be prevented during pouring care must be taken first of all that the metal does not set too early or too quickly in the molds. They must be preheated before being used. Also the temperature must be as uniform as possible, otherwise local places may show the surface blowholes. Care must be taken that the steel rises uniformly in all the molds, otherwise the steel will cool more quickly in those molds in which it rises the most slowly. This is the reason why sometimes only certain ingots from a heat will show this blowhole formation, and usually such ingots are those farthest from the pouring funnel.

On the other hand, it is also necessary not to pour too quickly, for then the gases do not have time enough to escape properly. Attention may therefore be drawn again to the necessity of properly designing the pouring plate, properly laying the runner bricks and arranging the pouring funnel correctly. Also the molds should not be poured too full, but up to within about 6 or 10 in. of the upper edge of the mold, to avoid too rapid cooling of the upper surface. The means to be used to avoid surface blowholes, so far as pouring is concerned, are therefore:

1. Sufficient and uniform heating of the molds before use.
2. Thorough cleaning of the molds outside the casting pit.
3. Proper design of the pouring plate.
4. Careful laying of the pouring plate and runner bricks.
5. Avoidance of pouring the molds too full.

### 6.—Scabbiness and Scales

Improper pouring will cause the ingots to have a rough, scabby surface. These scabs are caused by metal being thrown off during pouring against the walls of the ingot mold and freezing there. They are immediately covered with a layer of oxide. When the rising steel covers them up they are not absorbed but are clearly visible on the outside surface. Plates rolled from such ingots usually show scabs or scales, which have to be chipped off, causing increased operating costs. To avoid this scabbiness especial care must be given to the temperature of the molds. For instance, if hot soft steel enters a cold mold there is a sudden cooling and an active evolution of gas which sprays the metal against the walls of the mold. Further, these scabs can easily be caused by top pouring, especially if the nozzle is somewhat eaten away, so that the steel is poured in a wide stream. To avoid this trouble, therefore, these precautions must be taken:

1. The molds must be properly heated.
2. Top pouring must not be used.

Unfortunately all these precautions cannot always be observed, especially in plants that are pushed for tonnage because their capacity is too small. For this reason other methods have been worked up, such as the Harmet compression process, which needs a very expensive installation and which can only deal with a part of the output.

It is also questionable whether this process can influence favorably the position of the segregate. For these reasons this process is only suitable for certain plants, and

Dr. Canaris recommends the thermit process for removing the pipe. It has given him good results, as previously described by him.

# Are Profits a Proper Measure of Efficiency?

Standard Costs Furnish the Basis for Comparisons, but These Cannot Be Definitely Related to Net Profit—Sales Standards

BY STERLING H. BUNNELL

The November meeting of the American Society of Mechanical Engineers was devoted to a paper by Edward B. Passano, Baltimore, entitled, "Measuring Efficiency in Manufacturing on a Basis of Profit." Mr. Passano said, in part:

"The term 'results' as used in connection with business is synonymous with gain. The efficiency of a business is rated in proportion to the percentage of profit earned. The determination of hour cost is the object of the accountant. The engineer has adopted mechanical production as the basis of his work, and has established the amount which shall be produced in a given time. Neither accountants nor engineers by their different units of measurement get the true record of efficiency in terms of profit and loss. True efficiency is the ratio between the profit on what is actually produced and what would be the profit if the standard amount of work were actually produced."

The present interest in problems of promoting and recording factory efficiency was well shown by the reception given the paper and the lively discussion that followed. Nearly every speaker, whether engineer or accountant, differed from the author on some or all points; yet the entire discussion demonstrated that profit-making as a test of factory efficiency has possibilities of much interest. Too many engineers and factory superintendents are carried away with ingenious and labor-saving shop methods, and forget to notice whether their operations in detail or in mass are making money for the organization. In this way marvelously effective machinery is installed, when its product for three months cannot be sold in a year; or improved methods are introduced to cut costs 40 per cent, when the actual requirement to show a profit is 50 per cent. All the ideals ever dreamed of, put into a perfect factory, cannot make it a success unless it runs at a profit. Since the measure of business success is the profit, the measure of factory efficiency should be of the same dimensions—the dollar of net earnings produced in the factory operation.

## Profit a Widely Varying Quantity

Profit, however, is the most elusive and indiscriminate quantity that was ever suggested as a unit of measure. An elastic rubber tape as a measure of length would be no more impossible of practical use. Profit is never constant; it may increase because prices rise, as well as when costs decrease. Many factory operations are purely expense, representing loss and not profit, and profit is not made on a loss. The essential difficulty in using profit as a measure of factory efficiency is that profit is the difference between two variable quantities, cost and selling price, and so bears no definite relation to either one taken alone. Even when the values of the two variables have been found for the moment, and the difference taken, the result is only the "gross," while the true return is the "net," the remainder after subtracting other and highly indeterminate items. Further, these items, the selling and administrative expenses, are as much subjects of efficiency study as the manufacturing operations. To lump them in with the factory cost is to destroy the possibility of making any comparisons of value to the several departments.

## How Efficiency Ratios Are Made

Comparisons after all are what are wanted, for the purpose of determining whether the business is advancing or falling behind. "Efficiency" is a ratio or comparison be-

tween an actual result and perfection taken as 100 per cent. But since efficiency ratios are referred to the standard basis of perfection or 100, ratio can be compared with ratio, so that the result of 80 per cent. this month is observed to be better than the 75 per cent. of last month. If, however, the basis or denominator of the fractions is variable, no comparison can be made.

Business profits as a basis is about the worst possible, since it varies with every change in cost, selling expense or market price. And if it did not, who shall say that every item of product shall be sold at the same percentage of profit? Some items may involve larger risks, of spoilage, change in style, seasonal demand, or default in payment, and so require a larger margin if they are to be considered profitable. Others may be by-products, to be sold for a trifle over the cost of handling, or perhaps for a large price due to some incidental demand for them. If efficiency ratios are to be based on profit, either actual or arbitrarily set, what shall be done to measure the efficiency of operations that are purely "expense," like cleaning the workrooms or keeping the cost records? Profit is the ultimate end of the general factory operation; but it is not permissible to figure profit on those parts of the work which are not sold to outsiders and have no direct relation to the items that are sold and ought to carry a profit.

## Standards Not Definitely Related to Net Profit

The proper denominator for the efficiency fraction or ratio must always be the standard quantity, time or cost of the work, as set forth by Mr. Taylor and his associates, who formulated the principles of efficiency study in the trades. There is a standard amount for every item of work, whether salable or unsalable, "direct" or "indirect." There may be also standards set for selling and other expenses, as is done by the financier who scrutinizes the annual report, observes that selling cost is 10 per cent. of gross sales and concludes that this percentage is higher or lower than good practice under like conditions. None of the standards bears a definite relation to the net profit, though each may possibly bear a definite relation to the gross cost, or to the gross selling price. As the efficiency of the operations giving rise to each item of cost and expense should be known independently of all other items, a standard should be set for each operation, and the cost accounts should show the amount of departure of each item of cost from its corresponding standard. There will then be an efficiency ratio for each item.

In any manufacturing business, the gross expense to be covered by selling price consists of material, labor, sundries, factory expense, selling expense and administrative expense. The standard for each item of material may be known with accuracy. The standard for items of labor cost may be set by time-study methods, and the efficiency of the work will be expressed as the ratio of the work done to the standard amount of work, expressed in hours or cost. Cost sundries or incidentals, like freight and royalties, may in some cases be compared with standards; in other cases it may be found impossible to standardize. Factory expense cannot be standardized with relation to direct cost items, because it is by nature indirect and not distributable; but the expense items can be standardized in classes. Definite sums for expense items, such as coal handling, shaft and belt upkeep, and shipping expense, should be worked up and set as standards. The efficiencies of the expense items will then be expressed as the ratio of the cost of the standard amount of labor to the cost of the item as it was actually done. The total factory ex-



pense is distributed by a proper burden system. Selling expense should be determined as a schedule, in advance, and the efficiency of the sales department will then be expressed as the ratio of the actual cost of sales to the scheduled cost of the same amount of sales. Administrative expense may be similarly scheduled. These items of expense must be added as percentages to the cost of product to find the gross cost; and after that is known, the difference between it and the selling price is the profit. The profit might of course be compared with a standard profit, but the ratio will not be an efficiency ratio, since selling price, which affects profit, is not controllable by the factory, but by outside conditions.

#### How Standard Costs May Be Used

The efficiencies of the details of the factory, sales and administrative operations can be shown by the general accounts, and without reference to the uncertain profits. First, if costs are not so accurately controlled by standards that variation is impossible, set standard costs, credit the proper work-in-progress account with the actual costs, and charge the proper sales account with the standard values. The difference in the footings of these accounts will show whether the cost is less or more than it should be. The cost keeper already has effective methods for recording the cost of each completed order; let him enter each in a register of completed orders, set opposite each incidental cost the standard cost, and foot the two cost columns monthly for the works manager's information. As improved methods are introduced, or pieceworkers become more proficient, the margin of saving between the actual cost and the standard cost totals will increase. This margin is a measure of works efficiency, and shows the existence of a profit due entirely to the effectiveness of the factory force. It should be credited to the profit and loss account as an earning of the manufacturing department. The standard costs will be revised periodically, as improved methods are introduced; but their general stability is of the greatest service in providing a constant basis on which to make up costs of whole machines formed of standard parts, and selling prices based on known profits above cost. The every-day slight variations in the cost of parts made under usual shop practice serve to obscure the facts, since the cost sheets of every completed machine conceal the variations in the general total, which may average well with previous machines, or combine a number of chance extra costs into an inflated total. The standard parts cost system localizes the variation of each item of work by exhibiting its difference from the standard, so that steps can be taken to correct the fault immediately.

#### Sales Department Standards

Efficiency need not be considered as a virtue of the manufacturing department only. Salesmen too should be efficient. Here again the cost should be compared with a set standard. Easy profits are a temptation to easy spending and easy-going in the sales department. To obtain the best results gross profits should never be known outside of the inner circle of the management. Salesmen work most effectively under the incentive of the definite figures of gross sales, and need not know costs; in fact, it is safe to say that they should not know them.

The sales department should therefore be run on a schedule based on a proper percentage of gross sales. If goods are sold at fixed prices, open a profit account, charge the standard cost of goods manufactured, and credit the goods sold at the selling prices less the sales percentage. The profit in this account is a merchandizing profit, and should be known to the management only. The credits to the profit account are virtually the prices charged the sales department, and the gross profit of the sales department is the difference between these prices and the prices actually charged the purchasers. It is for the sales management to keep its expenses within this difference. If it does so, there is a profit which denotes efficiency in the department, while a loss shows a fault in its methods or results. If goods are sold at varying prices, and the margin of profit is affected by the salesman's ability, then the profit account is used as before, the charges are standard prices to the sales department, and the latter is credited with all the profit it can make above the standard prices.

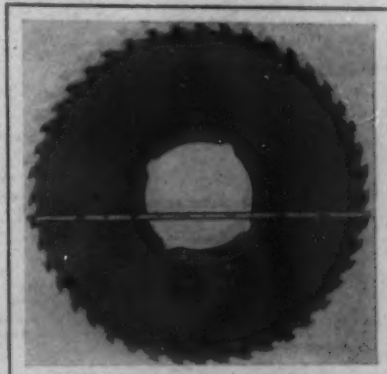
#### Efficiency in General Management

The general management must estimate its own efficiency by the combined efficiency of all the departments under its control. Reports to the general management should be made periodically, showing the profit made by the factory by holding its actual cost below standard (or loss if the costs go over standard); the profit shown over manufacturing standard-cost by the higher prices charged the sales department, and the profit made by the sales department between the prices charged to it and the prices secured for sold goods. These three profits make up the net profit of the whole operation. Against this may be set the salaries and general administration expense, if these cannot be handled as burden rates in making up costs, and the difference will then show the efficiency of the general management. Not uncommonly the management is at fault for operating on a schedule of administrative expense which eats up the legitimate profit and leaves nothing for dividends. A monthly comparison of the nature described will show whether the profits of the operation are swallowed up in "overhead," or the administrative department is justifying its expense by obtaining a net income for the factory.

Altogether, there seems to be no object in abandoning the accepted method of reckoning profit as the difference between a cost and a selling price, and using comparisons between standard profits and actual profits as efficiency ratios for each department concerned in the factory operations. Certainly, profit is the true basis on which factory effectiveness should be computed; and a wise apportionment of the profits against the expectations of the several functional departments and sub-departments enables the progress or retrogression of each to be known by a glance at the monthly reports.

#### A Large Inserted-Tooth Metal Saw Blade

What are claimed to be two of the largest inserted-tooth metal saw blades ever placed on the market have been recently manufactured by the Hunter Saw & Machine Company, Fifty-seventh and Butler streets, Pittsburgh, Pa. The blades are 84 in. in diameter and were made from 1-in. plates of special analysis steel which had been treated to withstand strains. These blades were designed for cutting 40-in. ingots and weigh 2000 lb. each.



The blades have two 26-in. collars, one on each side, which are riveted to the body of the saw and are milled with four equally spaced keyways by which the blades are driven by 75-hp. motors. The plates of the saw blade are milled with 44 pockets into which roughing and finishing teeth weighing 1 3/4 lb. each are alternately inserted. Each tooth is reinforced and is held rigidly in place by a 3/4-lb. tool steel wedge which is inserted at the back of the tooth. The plate is drilled and tapped at the bottom of the pockets to admit a hexagonal head brass screw that is used in setting the teeth to the proper height. In a test made of these blades a 24-in. ingot was cut in 10 min.

One of Two 84-In. Inserted Tooth Metal Cutting Saw Blades Recently Made by the Hunter Saw and Machine Company, Pittsburgh, Pa.

The Kline Motor Car Company has moved its entire business from York, Pa., to Richmond, Va., and now has a new plant, modern in every particular, composed of two 600-ft. wings, connected by a 154-ft. administration building in the front. The company's plans call for a large increase in production and it may go into the manufacture of commercial trucks.

# Suggestions from the Daimler Motor Works

## Power Cost Minimized in the Stuttgart Plant by Planning for a Steady Load—Repairing Handled in Independent Buildings

BY S. R. STONE

The accompanying illustration, showing the large assembling department of the Daimler Motoren Gesellschaft at Unterturkheim, near Stuttgart, Germany, was recently sent to the writer by one of the officials of that company whom he met while on a visit to these works. The operatives are here putting together machines of 1913 models.

At the left may be observed one of the floor trucks used in bringing parts from the several finishing departments, and in the center is a truck crane for lifting the engines and other heavy parts into place. Otherwise, very little mechanical equipment, except for hand tools, is used in this department, where the work is of the most careful manual character and carried out with the skill of a watchmaker. Indeed, after a walk through this shop, the American who has just arrived from Switzerland compares it involuntarily with the factories seen in Geneva.

### The Shop Regarded as the Principal Tool

In the development of the Daimler works the fact emphasized so much recently in the American technical

moved through an underground suction draft system, similar to those installed in some of the newer forge shops of this country. Furthermore, it is worthy of note that every piece of steel used in the Daimler machines is shaped and treated in its own plant. To this fact alone, in the opinion of the management, is due a large measure of the company's success.

### Group Drive for High Load and Power Factors

The machine shop division, which is housed in one building 495 ft. long and 430 ft. broad, contains nearly 1500 machine tools, not a few of which are of American and English make. Electric drive, mainly from short lines of shafting, is used throughout. The group system has here reached a high stage of operating economy, for so carefully has the work been planned that the load can be very evenly distributed during the day, making the pull on the power system almost constant. This results in load and power factors so high that the price of electric current is made very low by the plant supplying it. The as-



Assembly Department of the Daimler Motoren Gesellschaft, Unterturkheim, Near Stuttgart, Germany

press, that the shop is itself the principal tool, has not been lost sight of. One sees a group of buildings one, two or more stories in height, of brick and reinforced concrete construction, with practically as much glass along all sides as the limitations of space will allow. Erection of the present buildings dates from 1904, when the works were removed from Gannstatt, not far distant, to their present location, a site of 180,000 sq. ft. Every feature of them is thoroughly modern, and they are arranged to aid materially in the saving of time and labor.

Approaching the plant from the station, one comes first to a long two and three story building which houses the bronze and the aluminum foundry, as well as the plant for pressing on wheel rims; then the forge shop, containing a large array of steam and power hammers, forges, etc. An interesting feature of the last named is the fact that the smoke and gases are not allowed to find any circulation in the shop but are caught immediately and re-

sembling plant, shown in the illustration, is at one end of the building, and the completed parts come to it without the necessity for any retrograde movement or loss of time.

At the rear of the main building is another group consisting of the copper smithy, the cooler shop and the testing shop for the motors. Then follow the pattern and automobile body shop, the upholstering, painting and finishing department and the shipping rooms. In the basement under the latter are the pumps and other auxiliaries, as well as the power step down transformers, which take current from the municipal generating station at Unterturkheim, changing it to the required operating voltage.

One is, however, not yet done with inspecting the plant. A further large glass sided building or "shed," to use the term borrowed from the textile industry, with dimensions 332 x 200 ft., contains the wood-bending department, the file shop, the wheel shop, and a division for testing



materials, which is very thoroughly done. At the side of this building is a 2-story warehouse where the finished automobiles can be stored. Behind the shed, one discovers a complete water gas plant, the product of which is used in the works, and a boiler house which supplies the steam used by the hammers and presses, for heating and also in the process of gas making.

Thus it will be seen that the works are entirely self-contained except for the generation of electric power. On this the city makes a rate so low, for the reasons stated, that the Daimler management does not consider a power plant a good investment.

#### Entirely Separate Plant for Repair Work

The visitor notes with interest, not to say curiosity, that adjoining the plant is another which is essentially its counterpart in miniature. Here a very extensive line of repair work is discovered to be in progress, all such orders being carefully segregated from the building of new machines. The management finds that by keeping one from interfering with the other a large annual economy is effected.

In and around the shops are railroad tracks connecting with the main lines of the Vienna Paris railroad, which runs but a short distance off, and there is an excellent system of interworks communication.

The Daimler Company is well known for its Mercedes automobile and the silent Knight motor, which it was the first to adopt, but few Americans probably realize the extent and variety of its product. This includes heavy motor omnibuses and commercial trucks, railway passenger and work cars, military cars, including armored machines, and special vehicles such as are not known to this country, also motors for pleasure boats, ships, launches, etc., and for aeroplanes, hydroplanes and dirigible balloons. The opportunities afforded by the rapidly widening field of aeronautics are being taken full advantage of; special equipment for the work has been installed, and this is now a very important branch of the business.

#### A Power Press for Manufacturing Work

A punch press designed for manufacturing work has been recently brought out by the Rockford Iron Works, Rockford, Ill. This tool is made in both the inclinable open back type for foot operation and also in the flywheel type, the latter being the one illustrated. One of the important features of the press is a special type of automatic brake which, it is emphasized, reduces the friction load one-half. Fig. 1 is a view of the flywheel type of press, while Fig. 2 shows the positions assumed by the various parts of the brake mechanism when it is set.

The frame is of the straight line design with sufficient metal properly balanced where the greatest strain comes. The casting is made from a pattern without a core, which gives it uniformity, thickness and correct shape of the metal. The change from the upright to the inclined position can be easily and quickly made. The shaft and the driver are made from a single solid piece of hammered steel. The main bearings are very wide and are bored out at right angles to the center of the slide by a special fixture to insure accurate alignment. Adjustments are provided for all the bearings, which are also furnished with oil cups.

The slide is long to insure permanent alignment and is adjusted at one side only, thus making it impossible to throw it out of true. Tool steel is employed for the connection and screw which have not only simplicity and quick adjustment, but also stiffness. The clutch is of the sliding pin type and can be easily taken apart for examination and cleaning. Specially selected heat-treated tool steel is used for the clutch pin which is located in the driver. When the treadle is depressed, this pin is forced into contact with one of the three engaging points on the flywheel, thus making the press act instantly. A device is provided for locking the pin while it is withdrawn so that adjustments can be made or a die set without removing the belt from the flywheel. An automatic safety stop prevents repeating. The flywheel is very heavy and has a long bronze bushing bearing with provision for oiling while running. There are three hardened tool steel contact points so designed that the clutch pin is brought into contact with a gradual motion, which prevents any rebound and insures full contact.

The action of the brake mechanism, which is illustrated

in Fig. 2, is automatically controlled by the treadle. When this is depressed the clutch release pawl A is drawn down releasing the clutch pin B, which is forced forward by a

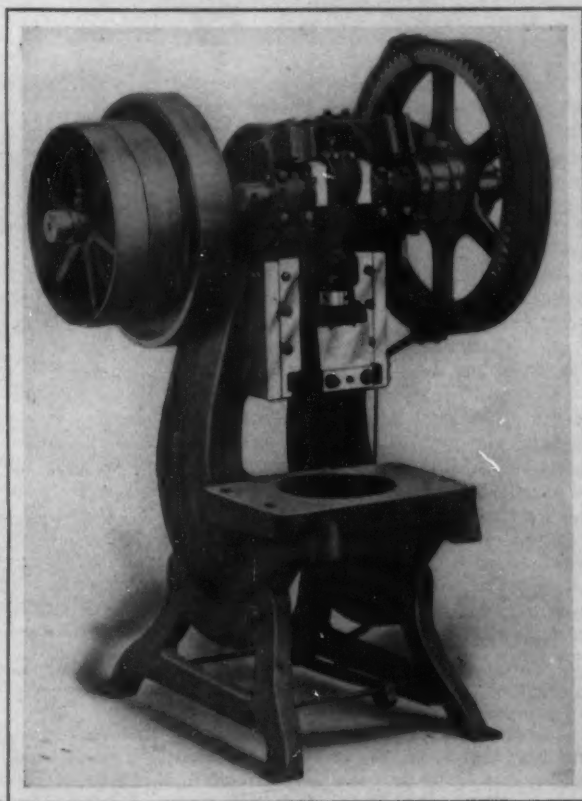


Fig. 1—The New Manufacturing Power Press Built by the Rockford Iron Works, Rockford, Ill.

compression spring into one of the three tool steel contact points on the flywheel. Just before the clutch pin is released the toggle joint C which holds the brake D against the hardened tool steel projection E on the driver F is broken by the pressure on the treadle. This releases the brake which is held in this position until the foot is removed from the treadle, the action of releasing the brake also reversing the operation of the press. A special feature of this brake is that, during its operation, there is no friction except at the top of the stroke. The brake is placed on the right side of the press, a location which eliminates all torsional strain on the shaft and gives plenty of room on the left side, so that an automatic feed, oiling device, etc., can be attached.

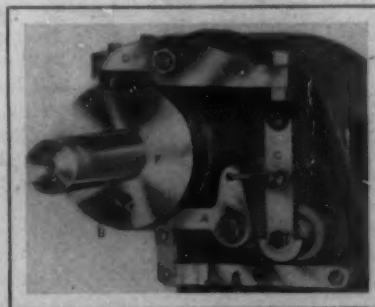


Fig. 2—Details of the Automatic Brake Used on These Presses

The knockout which is hinged to the press enters the slide at the back above the punch socket. It is positive in its action and is easily adjusted by a set screw and nut. The treadle can be locked down for continuous operation and removable tierods can be supplied for the two larger presses.

The world's production of gold in 1911 is estimated at \$467,449,600, according to the United States Geological Survey. Africa was by far the greatest producer, with \$192,972,100; the United States came second, with \$96,233,500; Australasia third, \$59,187,900; and Mexico fourth, \$29,196,000. Other large producers were Russia and Finland, \$24,865,000; China, \$10,000,000; British India, \$9,762,100. South America as a whole produced nearly \$17,000,000.

## Modern Steel Foundry Practice\*

Advances in Recent Years  
in the Different Departments

BY SAMUEL R. ROBINSON†

In acid practice the general construction has changed but little from the furnace of ten years ago. In building the usual 25-ton furnace it is now customary to put three rows of brick on the bottom plates and 18 in. of brick over the chill plates. The corners are not left square, but are "filleted," i.e., they are filled up with brick to prevent a breakout at this point. Charging machines are used on all the later furnaces from 20 tons upward. If space will not permit their use the furnace is served by a charging crane. The checkers are independent of the furnace; that is, they do not support the weight of the furnace. All furnaces are built entirely above ground with the top of the flues on a level with the ground.

The use of 50 per cent. electro ferrosilicon in place of the 11 per cent. alloy is general now; preferably in the furnace, but quite often in the ladle. The writer's opinion is that all additions should be made in the furnace as far as practicable, as the furnace is the proper place to make the steel and not the ladle.

Fuel oil is used extensively; in most cases being atomized with air at a pressure of 45 lb. of oil and 30 lb. of air. The usual plan is to have the pressure on the oil storage tank. Steam as an atomizing agent is very seldom used, as it is now generally known as a mistake to think that there is a gain in heat through its dissociation.

### The Small Open-Hearth Furnaces

Small open-hearth furnaces are coming into more general use; that is from 5 to 10 tons capacity. Twelve thousand pound heats are now being made in this type of furnace, making 140 openings of the stopper and requiring 1 hr. to pour. The life of such a furnace should be 500 heats without repairs.

The latest development in small open-hearth furnaces is the Carr furnace, of about 2 tons capacity, with the entirely new principle of pouring directly from the furnace into the molds. On account of the high temperature obtained this furnace allows of the manufacture of castings of thin section and intricate design. The metal is very pure, as there is no contamination except from the flame which is usually natural gas, although of course producer gas or oil can be used.

### The Converters

The accepted side blow practice consists in the use of a lower silicon, say from  $1\frac{1}{4}$  to  $1\frac{1}{2}$  per cent., with a blast pressure of  $2\frac{1}{2}$  to 3 lb. to the square inch. This is found to give quieter blows and hotter metal.

The biggest factors in successful converter operation are (1) clean hot iron from the cupola, and (2) fast working. Do not skimp on coke, and arrange to run so fast that it will not be necessary to shut the blast off the cupola. The practice quite often now is to "cut the flame short"; that is to turn the vessel down just before the drop of the final flame and then, without any final addition of iron from the cupola, adding lumps of wet ferromanganese to the converter, and 50 per cent. ferrosilicon to the ladle.

The old fire brick tuyeres have been replaced by ordinary iron pipes which are rammed up in position with ganister and are left in during blowing; when they burn off they are simply shoved further in and a new piece of pipe placed on the back end. The vessel is usually lined with silica brick, using 9-in. brick on the bottom, side-arch up to the tuyeres, wedge-brick up to the dome, and key-brick for the dome. Ganister is sometimes used, being mixed with a small amount of fire clay and rammed around a form. The cupola is lined with brick and usually patched with mica-schist or sandstone.

Chill pig iron is not used to advantage in cupolas under 42 in. inside the lining. For the smaller size cupolas it is better to use sand pig broken into four pieces if possible. The charge usually consists of 70 per cent.

pig and 30 per cent. scrap steel, although 50 per cent. scrap is carried regularly in some shops. In using 50 per cent. scrap the metal has to be handled very rapidly as it has not much life in the ladle. Eleven per cent. ferrosilicon is used in the cupola at times to bring up the silicon when the percentage of silicon in the pig is low. In fact, it is possible to melt and convert a charge of all scrap and 11 per cent. ferrosilicon without any pig whatever.

Lip pouring is the usual practice with converter steel, although bottom pouring, in a green sand molding shop using match boards and ramming up all work on the floor in regular rows, has many advantages. The usual practice is to use the same ladle with the original nozzle as often as possible, using a new stopper each time. As many as six blows can be poured through one nozzle at times. In some shops the nozzle is changed as well as the stopper after each blow.

### The Stock Oil-Fired Converter

The Stock oil-fired converter does away with the cupola altogether, melting the charge of pig and scrap in the vessel direct with an oil flame, and when at the required temperature, blowing the heat as in regular side-blow practice. Very few people realize the loss in the cupola as ordinarily conducted. The saving of heat by not having to transfer the iron from the cupola to the converter, also the reserve of heat left in the converter from a previous blow, must be quite an item. The metal can be made very hot and it is very pure, as there is no contamination from the flame.

The inventor of this process claims that a charge of  $2\frac{1}{2}$  tons can be melted and converted in  $1\frac{3}{4}$  hours with a fuel consumption of 70 gal. of oil and a power consumption of 50 kw.

### Molding and Inspection

The greatest improvement has been in the direction of a more refractory sand for facing by a careful selection of good silica sand and pure fire clay. Drying the molds is watched more closely and a continuous record of the oven temperature is kept at all times. Recording thermometers for core ovens are now in general use also.

All shop inspection should be in the hands of competent men and all castings should be checked against the blue print and inspected for imperfections before they are put up to the customer's inspector. The manufacturer has a fear of some present-day inspection, and consequently does not go after business that he otherwise would if he had the information at hand that would show him just what he had to look out for.

## An Improved Type of Safety Lathe Dog

A new type of safety lathe dog for which the features of protection for the operator, simplicity of action and the ordinary wrench adjustment are claimed, has been placed on the market by the Billings & Spencer Company, Hartford, Conn. As will be noticed from the accompanying engraving, the design of this dog is the same as the regular type, including the ordinary square



A New Form of Safety Lathe Dog Developed by the Billings & Spencer Company, Hartford, Conn.

head set screw, and a guard is added. The manipulation of this guard is said to be easy, it being merely pushed to one side when it is desired to remove or fasten work in place. As the screw is of the customary square head type, it is possible to make the adjustment with an ordinary wrench, the necessity for having an extra tool being thus avoided. After the screw has been adjusted the guard is swung back into position easily.

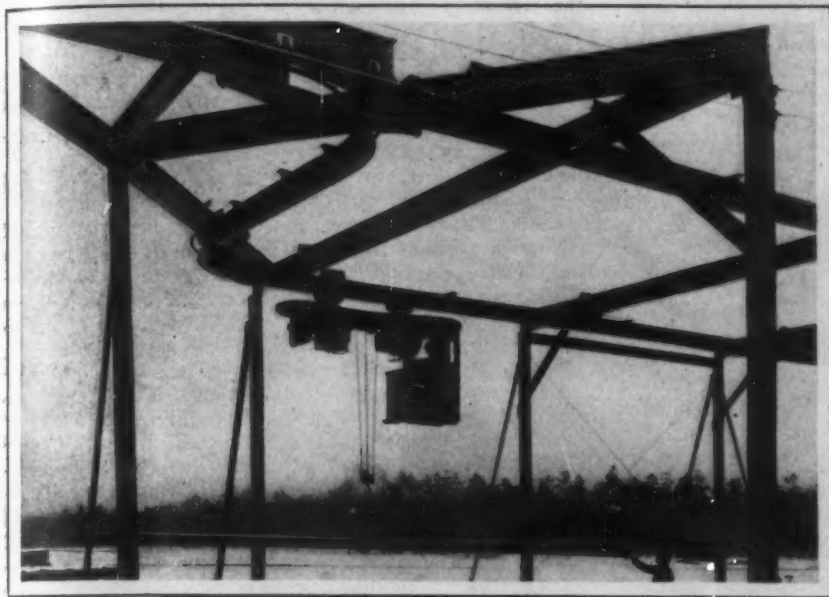
\*From a paper read before the recent meeting of the American Foundrymen's Association, Buffalo, N. Y.

†Metallurgist Duquesne Steel Foundry Company, Coraopolis, Pa.



## Monorail Switch with a Fixed Tongue

A departure from the commonly accepted standard practice has been made by the Shaw Electric Crane Company, Muskegon, Mich., in the design of its monorail switch.



A Monorail Track Switch Without a Moving Part Made by the Shaw Electric Crane Company, Muskegon, Mich.

The switch does not have any moving parts, the tongue being fixed, and it therefore does not have to be set for the direction in which it is desired to have the crane travel. The advantages of this type of switch as compared with the old moving-tongue one are that the delay necessary to set a switch is done away with and at the same time there are no open ends of track to be guarded.

As can be seen from the accompanying engraving, the two I-beams constituting the main track and the one which forms the spur terminate near the point of tangency of their center lines. A cast-steel extension piece or tongue is rigidly secured to each of the beams, the projecting portion of the tongue being on the same level as and constituting a continuation of the bottom flange of the I-beam. The shape of these tongues is such that there are open slots left between them through which the truck sides of the trolley pass as it traverses the track switch.

On approaching a track switch at which the operator desires to run from the main to the spur track, he pulls the steering lever which is located on the trolley near the controller. This raises a horizontal roller to a position in which it engages a curved rib on the underside of the central switch tongue and swivels the leading truck, thus diverting it upon the spur track. The trailing truck is also guided upon this track without any attention on the part of the operator. It is emphasized that no steering is necessary to return from the spur to the main track or to run through the track switch on the main line in either direction.

State Superintendent of Public Works D. W. Peck, Albany, N. Y., will soon advertise for bids for the construction of a lock and dam at Seneca Falls, N. Y., as Erie Barge Canal contract C, for which the engineers' estimate of cost is \$1,140,872.50; for the lock and dam at Waterloo, N. Y., Erie Barge Canal contract E, for which the engineers' estimate is \$319,651.50; for the steel superstructure of Howards Island bridge over the Erie Canal, contract 5A, estimated cost \$25,035; for a bridge over the Erie Canal, near Rocky Rift dam, contract 20A, estimate \$10,900, and a bridge over the Erie Canal at Matthews avenue, Solvay, N. Y.

The German wireless tower at Nauen, now being erected, will rise 917 ft., or 250 ft. higher than the structure blown down a year ago. The radius of the tower is expected to be 5920 miles, which would make possible messages from Berlin to Chicago.

## Drilling Machine for Boiler Shells

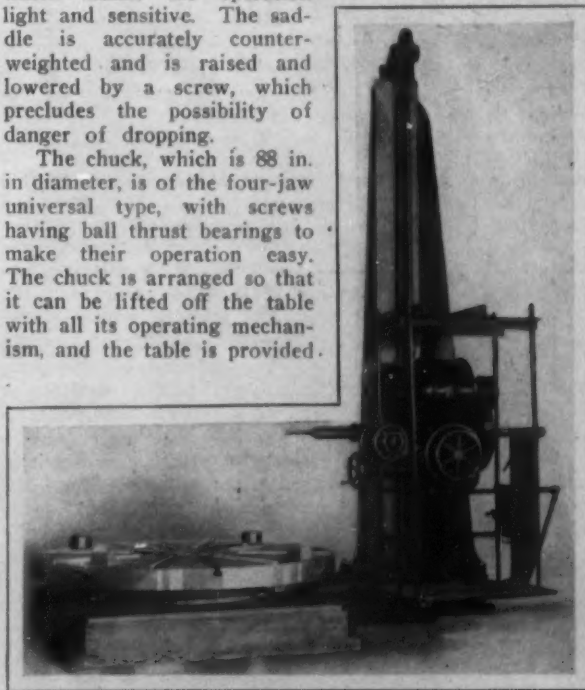
The boiler shell drilling machine built by the Bausch Machine Tool Company, Springfield, Mass., is a new type in which the shell after being rolled is centered in

a four-jaw universal chuck, capable of being rotated by the operator from the drilling position. The drilling spindle has a vertical travel on the column of 10 ft., the operator being located in a cage which is raised and lowered with the head so that he is always in one position in relation to the operating mechanism, which is all centered at this point. The power is obtained from a motor directly mounted on the saddle of the machine. With its vertical travel of 10 ft., the spindle has a feed of 20 in. It is directly geared to a variable-speed motor and the feed is directly connected to spur and worm gearing, which, by a jaw chuck, permit of several changes.

The two large handwheels seen directly beneath the motor control the vertical adjustment of the saddle and the rotation of the chuck. The large handwheel at the front gives a quick adjustment of the spindle, while the smaller one on top of it operates the clutch. The handwheel on the

shaft, which is parallel to the spindle, is a hand feed for drilling and facing. The machine has roller and ball bearings, including the main bearing under the faceplate, which makes the operation light and sensitive. The saddle is accurately counterweighted and is raised and lowered by a screw, which precludes the possibility of danger of dropping.

The chuck, which is 88 in. in diameter, is of the four-jaw universal type, with screws having ball thrust bearings to make their operation easy. The chuck is arranged so that it can be lifted off the table with all its operating mechanism, and the table is provided



A New Type of Drilling Machine for Boiler Shells in Which the Shell is Mounted in a Chuck and Rotated to Facilitate Drilling. This Machine is a Recent Product of the Bausch Machine Tool Company, Springfield, Mass.

with T-slots and may be used for strapping down ordinary work for drilling. The machine is 193½ in. high and 14 ft. in length overall. The top working surface and bed are approximately 7 ft. square.

The chuck is arranged to clamp on either the outside or inside of a boiler and is capable of handling shells from 36 to 72 in. in diameter and up to 10 ft. in height at one setting, and, by reversing, up to 20 ft. The motor and gearing are of sufficient power to drive a 1¼-in. high speed drill efficiently. The shipping weight is about 30,000 lb.

# Conserving the Data of Scientific Management\*

## The Place of the College in Gathering This Material and Making It Available for All Industries

BY WILFRED LEWIS.†

By scientific management is understood that type of management which is made to rest upon certain well-defined principles, in the application of which the highest efficiency in human labor is attainable. Mr. Taylor has laid down four fundamental principles of management as follows:

The development of a true science.

The scientific selection of the workman.

His scientific education and development.

Intimate friendly relations between the management and the men.

These principles have been expanded by other writers into many more, but in their application to any given line of work, the development of the science leads to vast accumulations of data which must be classified and arranged to be available for immediate use when needed; and the question suggested by my subject is: In what way can the college be made to collect and conserve the data of scientific management?

Hitherto these data have been accumulated at enormous expense, and their possession in the hands of different individuals or companies has meant practically the doing of the same work with slight variations again and again, simply because there has been no common depository of the data obtained. If a true science in management is really attainable, there must be a common pool into which the rivulets of information may flow, and out of which broad streams of knowledge can be drawn. The mere accumulation of data without intelligent classification and arrangement counts for little, and this fact was borne in upon me very forcibly when, after great diligence in the accumulation of certain records, it became more expedient to make new ones than to attempt to find what was wanted in such a heterogeneous mass of details.

### With Men as Its Product, College Management Is Highly Important

To a certain extent the scientific selection of the workman can be studied in our colleges, and by introspection students can obtain very helpful suggestions as to the career best suited to their abilities; but the scientific education and development of the workman, and the intimate friendly relations between the management and the men, when applied to teachers as managers and to students as workmen, takes on an unusual significance which may well arrest the attention of thinking men.

In modern industry, to which these principles are generally applied, the product is some material thing, the output of which is to be increased for the benefit of the labor employed, the management which directs it, and the public which consumes it; but in the college, the product is the workman himself, a living force fired with the energy of youth and full of promise to himself and all the world beside. The molding of this material for the market which awaits it, or the development of young men fitted for the battle of life, is surely an industry of pre-eminent importance, and it can hardly be doubted that the place of the college as an institution for collecting and conserving the talents of the rising generation for the best uses of the world depends more upon the scientific management it displays than upon anything else.

I am not sure that Mr. Taylor had in mind the college as a factory for the development of men when he framed his four great underlying principles of management; but he has always contended that there were no exceptions to their application, and I am inclined to think the up-to-date college must not only be alive to the importance of scientific management, but it must also absorb and disseminate the principles upon which its own effi-

ciency and that of its alumni can be built up and maintained.

### Labor Saving Management Raises the Standard of Living

Scientific management has hitherto been considered chiefly as a means for increasing the products of labor in industrial operations, and as such it is known to include the wage worker, the employer, and the consumer in its benefits. If "he who maketh two blades of grass to grow where but one grew before" is a public benefactor, what can be said of him who lights the way for every worker vastly to increase his output and so raises the standard of living throughout the civilized world? \* \* \*

It remained for Mr. Taylor to prepare the way for the accurate determination of a fair day's work by the scientific analysis of the elementary operations and the time required in detail. With these data properly classified and arranged, it is now possible to determine the time required on work never done before, and when the elementary operations in all lines of industry shall have been so analyzed, classified and arranged, it will be possible to determine the time required for the performance of manual labor under any given condition, and even mental effort to a certain extent can be so formulated. All labor must be resolved by analysis into its elementary units, and these units may then be combined for any desired result. The combinations to a given end may also vary, and the result will depend upon the skill of the expert who prepares the instructions which he must know to be practicable. These instructions are not unlike the laboratory instructions given to college students when they are expected to do certain things in a very definite and exact way, and very often in a certain limited time, and it may be said that the laboratory method is the method of scientific management in the progressive workshops of to-day. It typifies the art of learning by doing, in a very definite clear-cut way. It does not tolerate the initiative of the unskilled, but it gives more freedom to those better qualified to plan and direct.

### Let Colleges Collect Working Data of All Industries

Some of the data of scientific management were therefore collected and conserved by our colleges long before the term itself was coined, and if a department were formed for teaching the science of management, it might become the reservoir into which the working data of all industries might be poured for analysis and redistribution in a more helpful form. Such a department would have an important influence upon the study of political economy and trade unionism, and it might help labor to see its real interest in production rather than in the highest possible wages for the least amount of work. It should be apparent to the dullest intellect that the rewards of labor can not exceed the products of labor, that the producers of the world are its principal consumers, that high wages for a low product increases the cost of living, and that a large product adds to the general welfare of the community regardless of wages, which can not rise above their source as measured in the actual return of the same labor applied to mining the standard of value, gold.

All this should be apparent, but it is not, because the struggle still goes on to get more than is to be had out of everything, and by innumerable strikes and lock-outs, the products available for distribution are continually depreciated and reduced, to the irreparable injury of common labor, which suffers most from its own blind folly. In natural rights all men are equal, and it should be the aim of a beneficent government to insure equal opportunities to all. But in ability to embrace opportunities men will always differ, and compensation must be apportioned to results, if the highest efficiency is to be maintained and the largest product realized. The welfare of common

\*From the November Bulletin of the Society for the Promotion of Engineering Education. Paper read at the Society's Boston meeting.

†President Tabor Mfg. Company, Philadelphia.



labor depends, therefore, upon the welfare of skilled men who are not content with the same reward and naturally forge ahead.

#### Labor's Interest in Efficiency

Those who cannot direct or control must follow the leader or come to grief, and in taking their proper places in the world of industry they contribute in the fullest degree to their own happiness and that of the community in which they live. The law of supply and demand, freely exercised and applied to individuals, can be safely trusted to distribute the rewards of labor more justly and more advantageously to all men than any of the Utopian schemes which cut out incentive and endeavor to reduce the leaders of men to the ranks; because without incentive the efforts of able men will be relaxed, and civilization will surely decline. So, in the mining of gold, this industry will not continue unless the product is at least equal to the outlay in salaries, wages and fixed charges, and what common labor realizes in this industry can not be exceeded in any other industry without stopping or retarding the mining of gold upon which the maintenance of high wages depends. The matter of wages is therefore under automatic control, and since it does not affect the welfare of common labor so much as the total output in which labor participates, the main interest of labor clearly lies in the cause of efficiency. But how long will it be before this is recognized by the rank and file, and have we not in the philosophy of scientific management another field for the activities of college men? Efficiency suffers for want of expounders, and a vast amount of energy is misdirected by unworthy leaders to mischievous ends. When properly understood and applied there is no conflict between capital and labor under scientific management, and capital is recognized as a factor equal in importance to labor itself, without which the condition of labor would indeed be discouraging.

On the other hand, the concentration of fabulous wealth in a few hands, when heralded as it is in the newspapers and flaunted in the eyes of the desperately poor, cannot fail to cause discontent with mutterings of resentment and threats of violence and revolution. And while it is true that prosperity depends upon the energy born of ambition, the time will surely come when the conditions which permit such monstrous accumulations will no longer exist, and by the operation of beneficent laws, predatory wealth will be automatically returned to the community from which it was drawn. This can be done in such a way as to impose no obstacle to the realization of any reasonable ambition, and yet to make the acquisition of unlimited wealth attended by increasing difficulties. The data of scientific management would then be applied to the functions of government, as well as to ways and means for the accumulation and distribution of wealth, and there is really no limit to its fruitful possibilities.

#### The Data Required for Machine Shops

I conceive it to be the function of colleges to collect and conserve the data of the sciences which they undertake to teach, and if scientific management is to be one of them, the data upon which it rests should be included.

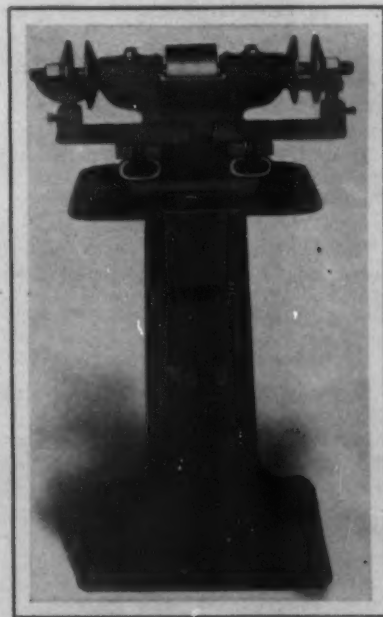
In my own business these data consist, roughly speaking, of certain elements which have been arranged in the form of a chart beginning with the charges for general expense divided into auxiliary, business and manufacturing, followed by classifications for stores, worked materials, tools, machine tools and materials. These classifications are subdivided and their subdivisions are again and again divided until we finally arrive at our slide rules for machine time and tabulated records for the determination of handling time. The former apply especially to the particular tools and machines in actual use, and the latter to information more general in character which would be applicable to machine shops anywhere. It may be impracticable to collect and conserve for general use the data for slide rules or the slide rules themselves designed especially for certain machines. This might be done by the machine tool builders, and the results obtained might or might not be their best selling arguments. The handling time, however, is of more general application, and some clearing house should be provided for its reception and distribution to avoid the expense consequent upon the repetition of this work by independent investigators.

I had thought at one time of the college as the natural depository and distributor of this information, and for this reason I believe my subject was assigned; but we now have engineering societies, some devoted in part to scientific management, others to it exclusively, also this Society for the Promotion of Engineering Education, any one of which might act as custodian for the data of scientific management, and with all these avenues open to those interested in the results, it seems to me that the subject belongs more particularly to the Society to Promote the Science of Management than to any other, and that the place of the college is to participate in the results and lend itself as far as possible to the development of a true science from the data obtained. Its help is also needed in the art of teaching, for under scientific management every plant of whatever description becomes in effect a trade school where unskilled labor is trained and directed to a broader and better sphere of usefulness. The acquisition of knowledge is one thing, and the art of imparting it to others is necessarily in the hands of men who have never been trained as teachers. College methods could therefore be studied to advantage by scientific managers, and the mutual interchange of ideas and experiences between managers and teachers could hardly fail to be of great benefit to both.

#### A New Royersford Grinding Machine

A grinding machine embodying a number of special features has been brought out by the Royersford Foundry & Machine Company, Royersford, Pa. Particular attention was given to

minimizing friction. The spindle, made of 0.30 per cent. carbon steel, is finished by turning and grinding; the bearings are bored and then finished by scraping. The oil receptacle is cored out of the head below the spindle and the lubricant is supplied to the spindle by a wick, both ends of which dip into the reservoir. After this reservoir is once filled the machine, it is stated, will run for months without further attention. The entrance of dirt, dust and emery into the bearing and the escape of oil from it are prevented by small grooves turned in the shaft inside the ends of the journal boxes. Five sizes of the machine are built.



One of the New Line of Grinding Machines Built by the Royersford Foundry & Machine Company, Royersford, Pa.

The property of the St. Louis Blast Furnace Company, at St. Louis, Mo., was sold under foreclosure November 26 by Isaac H. Orr, trust officer of the St. Louis Union Trust Company, trustee for the mortgage. The price paid was \$75,000, and the purchaser was the State National Bank, representing the holders of about \$200,000 of bonds. It is understood that the plant will be offered at private sale by the purchasers. It was built about 30 years ago and was operated almost continuously until in 1911, the last lessee being Arthur P. DeCamp. It was originally valued at about \$500,000.

The Colorado Fuel & Iron Company, Denver, Col., states that the report is entirely erroneous that it will remove its main office to Pueblo.

# The Dispatching System for the Foundry\*

## A Detailed Listing of the Points to Be Observed in Providing in Advance for Orderly and Expeditious Production

BY C. E. KNOEPEL

How many foundries are there where the practice is to arrange in advance, in a careful and scientific manner, the co-ordination of the work to be done the next day and the next week; where the details as regards adjustment are so mapped out as to insure working as nearly as possible to the co-ordination planned?

Supposing that on a certain morning you should step into your foundry at starting time and find that on all floors the sand was free from gagers, properly tempered and ready for use by the molders—that the patterns had been distributed and were in flasks on the floors ready for the molders to begin work—that each molder was employed on that class of work for which he was best fitted to perform—that where pit work was to be made, the pit had been dug and shaped for the pattern or sweep—that there was the right distribution of molders' helpers and laborers—that during the day as cores were needed, they were supplied the molders in advance of their requirements—that you noticed that in no case did molders have to discontinue work because facing or nails and other like materials were lacking—that in cases where flasks needed special barring, you noticed that the flasks on the floors contained either new bars or such cutting in the old bars as would accommodate the patterns—that as molders completed certain jobs, other jobs were ready in advance with patterns and flasks provided—that noticeable delays were reduced to a minimum—that rush orders had been provided for—that the men were working on the important jobs in the order of their importance—that all foremen not only knew what was going on but what the coming procedure was going to be—that this was the order of things for the whole day for all the men and that day in and day out this efficient working was the rule and not the exception. It is a picture that outlines an adjustment as it should be and fortunately as it can be, if taken as an ideal, accepted as possible, and all efforts concentrated on achieving these results.

### What Is Necessary to Get Maximum Efficiency

How are we to control the acts and so arrange the details that co-ordination may be at maximum efficiency? In the first place our conception or ideal should be—

1. No man should do any work that can be performed as well by another, with less skill and at less expense.
2. Work should be assigned to the men best fitted to do it and not given out simply because they have nothing else to do.
3. Sufficient work should be assigned in advance to insure keeping the men employed during the day.
4. The importance and availability of all work should be considered.
5. Selection and assignment of work should be the result of a getting together of those who are responsible for the management of the plant.
6. Waste time and lost motion should be eliminated whenever found.

The above constitutes an excellent ideal which every foundry should work to, a conception that is not only practical but necessary to the efficient adjustment of the following elements:

1. The workmen.
2. The orders.
3. The patterns.
4. The cores.
5. The flasks.
6. The rigging.
7. The incidental accessories, such as nails, gagers, sand, chaplets, etc.
8. The pouring.
9. The taking out of work.
10. The cleaning.

In considering dispatching there are two things to keep in mind:

1. The making of the plans.
2. Execution according to the plans.

And if proper attention is given to them, faulty conditions will be reduced to a minimum, if not entirely eliminated, for their assumption is—no job is ready until everything is or will be ready for the job—a most important consideration.

### Elements of Planning and Execution

Planning is made up of six important elements:

- (a) What is to be made.
- (b) Whom it is to be made by.
- (c) Where it is to be made.
- (d) When it is to be made.
- (e) How it is to be made.
- (f) With what it is to be made.

And you can readily see that if every job is forced through this kind of an advanced and well regulated analysis, considerable good is bound to be the result.

Execution is composed of the following elements:

- (a) Knowledge of the plans made.
- (b) Preparations for carrying out the plans.
- (c) Carrying out the plans as per schedule.

As the desire is to harness planning and execution so as to make an efficient working arrangement, the order, which is our starting point, should receive some attention; so that we may know something regarding its availability.

The following test is a good one:

1. Are the patterns and core boxes as per order?
2. Are they ready for delivery into the foundry?
3. Are there flasks to accommodate the work?
4. If not, will they have to be made or can others be altered to suit, and if so what work will be necessary?
5. What will the job take in the way of rigging?
6. Is the rigging in hand ready for use or will it have to be made? If so what work is necessary?
7. What will be necessary in the way of rods, gagers, clamps, etc.?
8. How long will it take to get the job ready?

Until an order can pass this test it should be classed as not available, and under no consideration except extreme urgency should such a job be started. A rule of this kind will prove of extreme value in any foundry.

### Importance of Setting a Completion Date

The next point to consider is the promise. One should be made for each job in order that the work can be traced with reference to a time of completion. Promises should never be made, however, before the availability of the work has been passed upon. Such promises are never dependable and the time and energy in making them is usually wasted, as a great many know.

An order arrangement that will consider these two points—availability and promise—should therefore be built up around the following points:

1. It should admit of a quick and ready reference.
2. It should show availability or non-availability, at a glance.
3. It should show anticipated delivery dates.
4. It should notify pattern storage what is wanted in the way of patterns, sweeps and core boxes.
5. It should enable pattern storage to notify foundry as to condition of the items called for.
6. It should show reasons why work is not available.

It is evident from the above that we are now in possession of three valuable items of information:

1. We know what is not available and why.
2. We know when work becomes available.
3. We know when work is wanted, or the promise date.

With this knowledge we can commence the task of getting the work under way according to the following general outline:

\*From a paper read before the American Foundrymen's Association, Buffalo, N. Y., September 24, 25 and 26.



1. The details should be in charge of a committee comprising foundry foreman, his assistant, core-room foreman, as well as the flask and labor bosses.

2. The work should be undertaken as early in the day as possible so as to allow ample time to get in readiness whatever may be necessary to start the jobs properly.

3. The work being made in the shop and the men engaged in it should be carefully sized up.

4. Patterns, sweeps and core boxes covering jobs that are to be started should be laid out in pattern storage, in space that will enable those planning to get at them easily.

5. A means should be provided for listing the work as planned.

6. In selecting the work the six considerations under planning should receive attention.

7. If more than one job is selected for a man or the floor attention should be given to the order in which they are to be made, in order to know what to get ready first.

8. The core-room foreman should note carefully the selections made so he may have the important core boxes sent in first.

9. The flask boss should note what flasks will be necessary for the various jobs that are planned.

10. The labor boss should note what rigging will be necessary so that he can get at work as soon as the planning is over, with.

11. A means should be provided for marking the patterns with the numbers of the men who are to make them.

12. The pattern storage should set apart from the patterns available those which have been selected for making.

With the above consideration given to the planning, we can next consider the element—execution. As was previously pointed out, this is made up of three steps—knowledge of the plans made, preparations for carrying them out, and carrying out the plans as per schedule.

#### Carrying Out the Plans Made

An analysis of the preparations for carrying out the plans will show that it subdivides into the following:

1. The patterns.
2. The cores to be made.
3. The flasks to be located, repaired or changed.
4. The rigging to be brought in and the necessary changes made.
5. Special features looked into, as for instance special gagers, rods, clamps, etc.
6. Changes in conditions to facilitate the new work coming in.
7. The work at night.

As to each of these seven divisions the following can be roughly outlined:

**Patterns.**—Small patterns should be brought into the foundry on the afternoon previous to making and placed in the racks for the men. Large patterns should be brought in toward night and arranged in some convenient place from which point they can be easily handled.

**Cores.**—As soon as possible, after planning, the core-room foreman should see to it that the most important core boxes are brought in so that his force can begin on them without delay. The remainder can follow in the order as scheduled.

**Flasks.**—The man in charge of the flasks should ascertain what is necessary to take care of the work coming in. Flask parts that have previously been made should be assembled; those needing chucking should be promptly attended to, the necessary patterns to be taken from the pattern storage for this purpose. If repairs are needed they should be made at once.

**Rigging.**—Rigging in the way of plates, rings, arbors, etc., should be brought in and the necessary changes made so that they will be available when wanted.

**Special Features.**—If special gagers, rods, etc., will be needed, they should be made on the day previous, so as to be in readiness when wanted.

**Conditions.**—Changes in conditions should not be slighted. A job may take a special mix of sand; a pit may have to be dug; a large amount of heap sand may be needed; brick may be used, or something else varying from the ordinary method of procedure may have to be done, and the time to do it is certainly not when the molder is at work.

**Night Work.**—The man in charge of the night force should be informed as to his share of the work necessary

to carry out the procedure as scheduled. Castings should be taken from the sand to the cleaning room; gagers removed from the sand heaps and placed on the back of the floors; sand tempered and put in condition for use by the molders in the morning and the flasks not needed taken from the floors. Pits should then be dug according to the sizes needed.

#### Carrying Out the Plans as Per Schedule

Planning in itself may be careful and thorough; preparations to carry them out may be up to standard, but unless the actual procedure is one which does things according to the schedule, the results will not be forthcoming. The first hour in the morning is really the most important time in the day. There are a lot of men to be attended to; flasks, patterns and rigging must be distributed and it cannot be all done at once nor to advantage unless there is some organized arrangement. The following is therefore suggested:

1. The night force after the regular night work is done, as outlined, should place on the molder's floors, according to the schedule furnished the night foreman, the various new large flasks that are to be used in which should be placed the patterns. If pits are to be used, the patterns should be placed near them. This will ease the work of the cranes to quite a degree.

2. About a half hour before the regular starting time in the morning, the laboring force, or part of it, should report and distribute the smaller flasks and patterns.

3. As soon as work is begun in the morning, whatever may be necessary in the way of rigging should be taken to the floors.

4. There should be a regular place for all supplies and the knowledge of their location should be in the possession of all.

5. Facing sand (which should be mixed in advance) should be kept at each molder's floor and replenished as necessary before (not after) the men may need some.

6. The labor foreman should carefully watch the needs of the men as to cohes. There is no excuse for a molder asking for a cope only to find that it is at the bottom of a pile.

7. The molders should be kept supplied with tools and equipment and should report their needs to the labor foreman.

8. Cores should be furnished the men in advance of their requirements. They should never be made to go for them.

The machinery to handle all this is not as complicated as might be imagined. The fundamental consideration is knowledge in advance and the details can be taken care of without much difficulty. There should be job tickets or "service cards" on which all information is entered from the orders. There should be large dispatching boards in some central location from which the work of the men can be controlled. This board should reflect the following conditions:

1. What is being made.
2. What should be made next.
3. What constitutes the work to follow and the order in which it should be made.

There should be an entering of starting and finishing time and the number recorded on all job tickets. There should be a written daily schedule covering the work of the men for the following day. There should be a schedule covering the job that will show progress of the order. These are the main considerations that can be built around the principles previously outlined, to make an efficient dispatching arrangement.

Referring to the coke situation as a limiting factor in pig iron production the weekly market letter of Matthew Addy & Co., says: "There is a growing shortage of labor and a shortage of cars. A dozen furnaces of which we have knowledge have been obliged to shut down for as much as 24 hours at a time owing to a lack of coke. We anticipate that the first great storm of the winter will tie up the coke fields and make the situation worse."

A bill will be introduced at this session of Congress compelling railroads engaged in interstate passenger traffic to use all-steel cars before January 1, 1914.

## Combination Boring and Milling Machine

A new design of floor type combination boring, milling, drilling and tapping machine has been brought out by the Rochester Boring Machine Company, Rochester, N. Y. The special features claimed for the machine are a wide range of adaptability and capacity and the combining in a minimum space of the capacity and range of several individual machines. Large, small or irregular shaped work can be machined, it is emphasized, with practically the same results, and single pieces can be finished at such a rate as to compare with the economy secured where work is turned out in quantities. It is possible to do boring, milling, drilling, tapping, splining, oil grooving and rotary planing at one setting, and with a swiveling table the different sizes of the work can be completely finished.

The saddle, which is of the box type, is strongly ribbed and is built as a complete unit, its construction being such that the entire operating mechanism is readily accessible. The

permits continuous feed for pieces of ordinary length.

The method of feeding is through a large bronze nut engaging a square thread in the spindle, the nut coming in contact with the sides of the thread only. The end thrust in either direction is taken directly on large diameter ball bearings and instead of the usual line contact between the teeth of the gear and the rack, a long bearing is said to be provided by the square thread in the nut which is engaged for its full length with the thread in the spindle. The nut rotates at the same speed as the spindle

when the feed is disengaged and for this reason, it is claimed, the possibility of wear is remote. When the feed is applied the nut rotates at a different rate from the spindle, the speed being faster according to which feed change gear is engaged or slower if the feed is reversed. The arm is controlled by a handwheel, whether at rest or running, through positive planetary gearing, and end thrust for milling is taken directly in the saddle with a bronze thrust bearing independent of the end thrust encountered in boring.

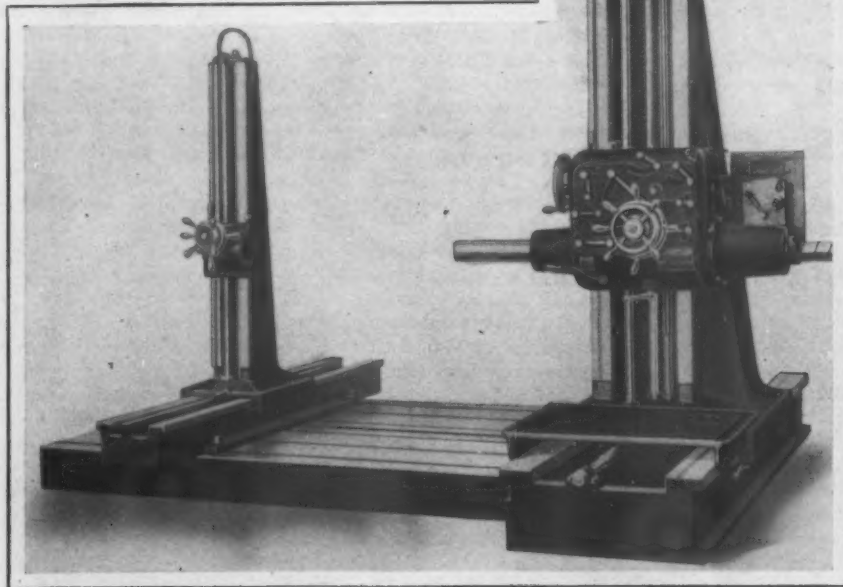
The principle of rotating and feeding the spindle through its own bearing gives a lapping motion, which it is emphasized eliminates scoring or cutting.

A wide range of speeds and feeds are provided to meet all necessary requirements. Vertical milling feeds are provided for the saddle and horizontal milling feeds for the column independent of the boring feeds. All of these feeds are the same for every part to which they are applied. They are all reversible and any desired change of the 16 can be instantly obtained, while it is impossible for two feeds or speeds to be engaged at the same time. The speed range which gives 12 changes can be varied to meet special requirements, thus giving faster or slower speeds at the same relative ratio.

In the construction of this machine a number of safety devices are employed. Friction clutches are used in the vertical high-speed shaft and also for engaging the power feeds. While these clutches are positive up to their designed capacity, they provide yielding points which prevent the mechanism from being damaged. With this exception all the feeds are positive. Automatic safety knockouts or stops are provided for the saddle, the column and the spindle at their extreme positions, thus insuring protection against accident or damage. No two feeds or speeds can be engaged simultaneously and it is impossible to engage the power rapid traverse in different directions or at all until the feeds are disengaged. All the gears and moving parts are inclosed and fully protected.

With the standard electric motor drive, the motor is mounted on top of the column, where it is out of the way of chips and dirt, the power being transmitted through rawhide gearing to a vertical shaft that in turn engages with the driving mechanism inclosed in the saddle. This arrangement, it is emphasized, eliminates a number of gears and shafts and results in a high efficiency of power transmission being secured. Either direct or alternating current motors can be used.

The Haase Machine Works, 411 Fifth avenue, South Minneapolis, Minn., has turned over the milling machine it has been making to the Albert Lea Machinery Company, Albert Lea, Minn. The Haase lathe miller is especially adapted to repair shops, garages, etc., which do not have enough milling work to warrant the investment in a regular or universal milling machine. On the Haase miller fully 40 per cent. of the milling jobs can be done without mandreling the work.



A Floor Type Combination Boring, Milling, Drilling and Tapping Machine Built by the Rochester Boring Machine Company, Rochester, N. Y.

levers and handwheels for the various changes of speeds, feeds and traverses are also arranged as to be convenient for the operator. The lever for starting, stopping and reversing the machine is also located on the saddle and the machine is controlled by this lever without stopping the main drive. Hand adjustments and reversible power feeds are provided for milling as well as a power rapid traverse for quickly bringing the saddle to any desired position. The saddle is counterbalanced by a weight and there are automatic safety stops at the extreme positions to prevent accidents. The column, which is of heavy construction, has a long and wide face, is side braced and designed to give rigidity in all directions. It is adjustable on the base by hand or power and reversible power feeds are provided for milling as well as a power rapid traverse. Conveniently arranged binders enable it to be clamped quickly in any desired location.

Hammered high carbon crucible steel is used for the spindle, which is rough turned and finished by grinding. It is journaled in long phosphor bronze bearings which are adjustable from the outside and have felt wipers. These bearings are located some distance apart at each end of the saddle, an arrangement which gives a rigid support and is made possible by the feed and drive being applied in a central location between the bearings. Two large spline keys fitted into a steel sleeve upon which the driving gear is mounted drive the spindle, and the sleeve is journaled in an independent bearing and clearance is provided between the sleeve and the spindle to eliminate any chance of vibration being transmitted from the driving gears. Any desired length of spindle can be furnished and the full traverse is obtained without resetting by a concentric screw feed. This feed is a special feature on these machines and in addition to being powerful



# Electricity from Steam from Drop Forges

## Two Ohio Plants Equipped With Low-Pressure Steam Turbines and Electric Generators —Electric Heating Furnaces in One Case

In every drop forge plant there is usually a large surplus of exhaust steam from the hammers. This is commonly wasted, and the operation of the plants is uneconomical as regards the conservation of the energy of the steam. To effect a saving of this waste steam and to convert it into electricity for other uses has been the purpose of interesting installations which have just been made by the Cleveland office of the Dravo-Doyle Company in two Ohio drop forge plants. These are the plants of the Transue & Williams Company, Alliance, Ohio, and the Canton Drop Forge & Mfg. Company, Canton, Ohio. The exhaust steam in these plants is to be used to drive low-pressure steam turbines for generating electric current. They are believed to be the first installations to be made in drop forge plants for the purpose of utilizing waste steam.

In the case of the Canton plant the electrical power thus generated is to be used in electric furnaces for heating the metal in place of the fuel burning oil furnaces. The installation is also the first one combining a low-pressure turbine and the electric furnace in a forge shop. The possibility that in the near future electrically heated furnaces may largely supplant oil burning furnaces because of the rapid advance of the price of fuel oil and the fact that the supply of fuel oil has been cut off in some parts of the country and may be discontinued in other sections, add special interest to the plant. However, while electric furnaces have not yet been given a thorough practical test in forge shops, it remains that should results obtained from them not warrant their general adoption for such purposes, the power generated from the exhaust steam from the hammers can be employed in other ways. In the plant of the Transue & Williams Company the electricity generated from the waste steam is to be used in the machine shop and for other consumption.

In both plants the turbines are arranged to receive high-pressure steam automatically in case of failure of the low-pressure steam supply. The Canton turbine is run condensing with 2 in. absolute vacuum and receives the steam at 1 lb. gauge pressure. It is direct connected by means of gears to two 100-k.v.a. Crocker-Wheeler alternating-current generators having direct connected exciter. The condensing equipment was furnished by the Wheeler Condenser & Engineering Company, and circulating water for the condenser is obtained from wells, and the water is supplied to the condenser by means of a motor-driven De Laval centrifugal pump. The condensate is returned to the feed-water heater, which is a Cochran equipment.

The low pressure steam turbine in the Transue & Williams Company plant is direct connected by means of gears to two 100-kw Crocker-Wheeler direct-current generators. The exhaust steam from the hammers is passed through a Cochran low-pressure receiver-separator to remove the oil from the steam and thence reaches the turbine. The condensing equipment consist of a Schutte-Koerting multi-jet eductor condenser. The condensate and circulating water are discharged from the condenser into an open hot well from which the water is taken by means of a De Laval centrifugal pump and sprayed through a series of Schutte-Koerting spray nozzles for cooling purposes from the cooling pond. The water is returned to the condenser by a second pump.

In the plant of the Canton Company two electric furnaces built by the Electric Furnace Company, Alliance, Ohio, are being installed. In the operation of the drop forge plant the heating of a large quantity of metal for the hammers is needed. While oil burning furnaces are generally in use for this purpose it is claimed that these furnaces are both wasteful of fuel and of metal. The oxidation losses in oil burning furnaces are claimed to be so heavy that the percentage of metal loss is high. With this disadvantage and from the fact that the cost of operation of oil burning furnaces has been largely increased operators of forge shops appear to be turning their attention to other methods of heating metal. The use of

producer gas is one solution of the problem and another is the use of electric furnaces. The use of electric furnaces, it is admitted, would be the ideal method, providing the operating cost can be kept down to the point of economy. In the electric furnace it is found possible to maintain an even temperature which is difficult with the oil-fired furnaces. By excluding the air, oxidation of the metal is prevented or minimized in electric furnaces. The practicability of the use of electric furnaces in drop forge plants seems to hinge entirely on the question of economy and the utilization of the low-pressure steam which is present in large quantities and may make possible the production of electricity at a sufficiently low cost. If expectations are realized the Canton installation will result in turning out not only better but lower cost drop forgings.

### A Vertical Clamp for Handling Boiler Plates

The Never Slip Safety Clamp Company, 141 Broadway, New York City, has brought out a new type of vertical clamp, intended for holding plates, sheets or other flat material while being

worked or transported from place to place. As shown in the accompanying engraving the clamp consists of a hook and a lever. One end of the lever is connected to the hook by a pivot and the other end has a ring for attaching the chain which supports the clamp, so that the plate bearing against the hook brings the other end of the lever against the plate. The clamp is easily attached or removed and the claim is made that it cannot slip. Three sizes have been brought out to accommodate various thicknesses of plate with a maximum of 8 in.



A New Type of Clamp for Handling Boiler Plates and Other Flat Material  
Made by the Never Slip Safety Clamp Company, New York City

The new Trumbull Steel Company, Warren, Ohio, will manufacture all grades of tin plate, galvanized sheets and formed roofing products. The company states that it is installing a compound condensing engine and the best possible equipment that can be obtained. The buildings, which are of steel, are expected to be finished about January 1 and other construction work will be pushed.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, has taken an order from the Inland Steel Company, Chicago, for 36 Hughes mechanical gas producers. These will supply gas for the present open-hearth furnaces of the Inland Company, taking the place of fuel oil that is now being used. The company will also supply other furnaces now being built.

**DR. J. H. COHEN & SONS,**  
Mechanical and Civil Engineers,  
PITTSBURGH, PA.

# State Railroads of the Dutch East Indies

## The Railroads on the Island of Java and Sumatra—Equipment of the Repair Shops—Numerous American Tools

Commercial Agent D. C. Alexander, Jr., has furnished an article to the Daily Consular and Trade Reports, issued by the Bureau of Foreign and Domestic Commerce, from which the following extracts are taken:

The state railroads of the Dutch East Indies are under one general management, with head offices at Batavia, but they are operated in four divisions, as follows: West Java line, 641 miles; East Java line, 598 miles; West Coast of Sumatra line, 152 miles; and the Tykampek-Tylamaja tram line, 38 miles. This gives a total mileage of 1429. All are of the Dutch Indies standard gauge (1.067 meters or 3 ft. 6 in.). In addition, the state owns and operates 17 miles of 60-centimeter (23.62-in.) gauge steam tram lines, which serve as feeders for the main lines.

In the past extensions and improvements have not kept pace with the increasing traffic, but the administration is now fully awake to the necessities of the situation, and has adopted comprehensive plans for expansion and betterment. The most important step in this direction is the decision of the Dutch Government to begin the construction of the Middle Sumatra Railway, a line which will extend through the whole length of the island of Sumatra.

Sixty-five per cent. of the locomotives in use on the Java state railroads are of German manufacture, 23 per cent. British, and only 5 per cent. have been built in the Netherlands. On the East Coast of Sumatra line all of the 65 locomotives are of German manufacture. All passenger coaches now in use have been built in Java; only wheels, axles and trucks have been imported. Sixty-five per cent. of all the freight cars in use are the closed two-axle freight cars. These cars, with the exception of the wooden floors, are usually purchased from European builders and shipped "knocked down" to Java, where they are easily assembled. The price of the small car delivered in Java is said to be from \$320 to \$330 each.

Six repair shops are maintained in Java for the state railroads. These are situated at Bandeong, Madioen, Soerabaya, Mt. Cornelis, Djember and Poermoredjo; but only the first three named are of sufficient size to deserve detailed description.

### The Bandeong Shops

As each branch of the work in the Bandeong shops is rigorously separated from the other branches, there are in all some 16 buildings, which are in eight parallel rows. Power is obtained from a hydroelectric plant a few miles away. This power station, like many others in Java, has been built by a private company; but by the terms of the company's charter the government retains a considerable measure of control and must approve the rates at which power is to be sold. In this case the rate is \$1.60 per hp. per month, the shops taking about 300 hp. in all. Practically all of the motors and other electrical apparatus now installed in and ordered for the shops at Bandeong, Madioen and Soerabaya are from a single German company, which appears to have a virtual monopoly of the electrical supply business in Java.

The forge and blacksmith shops at Bandeong and Madioen are the cleanest and most orderly the writer has ever seen. All of the fires (there are 54 at Bandeong) are completely hooded and connected with an underground brick-lined tunnel, with an exhaust fan driven by a 40-hp. motor at the base of the stack. The absence of the usual litter of iron, tools, etc., from the floor may result from the workmen's consideration of their own bare feet; but the clean windows, fresh paint and general absence of grime and disorder are a tribute to the proverbial orderliness of the Dutch.

The hammer equipment includes three steam hammers of 2, 5 and 8 cwt., and a new Yeakley motor-pneumatic hammer of 1 cwt. from Bêche & Crohs, Hückeswagen, Germany. The combined punching and shearing machine is from the Werkzeugmaschinenfabrik, Chemnitz, and the

spring-testing machine from Möhr & Federhaff, Mannheim, Germany.

The boiler shop is served by a 15-ton electric traveling crane, built by the Haarlem (Holland) Maschinenfabrik. The equipment includes a 20-ft. plate planer from the Niles Tool Works, Hamilton, Ohio; three cold saws and a plate straightener from Gustav Wagner, Rutlingen, Germany, and a 30-millimeter plate shear, also of German make. Compressed air is not used in any part of the works, the management having found that the Javanese workmen are not strong enough to use air hammers properly. Consequently, all riveting, calking and chipping are done by hand. Some electric drills are in use, however.

The foundry contains three cupolas and four flat brass furnaces, but no molding machines have thus far been installed.

All of the lathes in the wheel shop are from the Chemnitzer Werkzeugmaschinenfabrik, Chemnitz, Germany, successors to the firm of Joh. Zimmermann. Their machines are usually referred to as Zimmermann's. The newest wheel lathe, which has four tool rests, swings 1 meter, and another of the same size, but more powerful design, has been ordered from the Maschinenfabrik Deutschland, Dortmund, Germany, for high-speed turning with gang and formed cutters. There are four radial drills in this shop, three of German and one of British make.

The equipment of the main machine shop is about equally divided between American and German machine tool builders, with a few British builders represented. Most of the German machines are from either the Zimmermann shops or from the Sachische Maschinenfabrik, Chemnitz, successors to Richard Hartmann. They are usually known as Hartmann's machines. The predominance of these two makers among the German tools in the shop is said to be due to the fact that a majority of the locomotives in use on the Java railroads have been built by these two firms and that tools for repairing them were "naturally bought from the makers of the locomotives." The American machines now installed are:

American Tool & Machine Company, Boston: One turret lathe with thread-chasing attachment.

Hendey Machine Company, Torrington, Conn.: Three 12-in. engine lathes, with taper attachment and compound tool rest, but with European style of tool post.

Hamilton Machine Tool Company, Hamilton, Ohio: Two 22-in. upright drills.

Automatic Machine Company, Bridgeport, Conn.: One automatic lathe with 10-in. swing.

Landis Tool Company, Waynesboro, Pa.: Two plain grinders, one surface grinder and four single head bolt cutters.

Becker-Brainard Milling Machine Company, Hyde Park, Mass.: One No. 5 vertical milling machine.

Cincinnati Milling Machine Company: One No. 3 plain horizontal milling machine.

Warner & Swasey Company, Cleveland, Ohio: One No. 2 hollow hexagonal turret lathe.

Gisholt Machine Company, Madison, Wis.: One universal tool and cutter grinder.

Shaper of American make, 14-in., from which the maker's name has been removed.

Of British machines there are only a vertical surface grinder, with oscillating feed, from Beyer, Peacock & Co.; one of Geo. Richards's open-side planers, and a single head bolt cutter from Kendall & Gent.

The Hartmann machines include four gap lathes, several upright drills, one horizontal cylinder boring and facing machine, a 6-ft. plain radial drill, a twist drill grinder, a 4-ft. 6-in. surfacing lathe and a new gap lathe, taking 16 ft. between centers.

From the Zimmermann shops there are three small horizontal plain milling machines, one large vertical milling machine, three single-ram and one double-ram traverse shapers, a small planer with one head, a 15-in. profiling slotter and a couple of upright drills. A 10-in. precision



lathe has recently been ordered for this shop from W. von Pittler of Germany, but has not yet arrived.

A lathe from H. Wohlenberg, Hanover, Germany, was pointed out as having a feature worthy of consideration by American makers. In this machine the carriage is guided by shears on the side instead of the top of the bed. This arrangement is said to prevent the wear which usually occurs from chips falling into the V's, thus keeping the lathe in alignment for a longer period.

The equipment of the woodworking and car-building shop is not equal to that of the other shops in the works, most of the machines being old and many quite out of date. A large majority of the machines are from Perin & Panhard, Paris, France, or Panhard & Lavassor, of the same city. The former firm has supplied three surfacing planers, a tenoning machine, a two-spindle drill, a hollow chisel mortising machine and two vertical band saws. Three large frame saws are from Panhard & Lavassor, and a horizontal plank-ripping band saw is from the shops of Pickles & Son, Headen Bridge, England. The more modern machines are a chain mortising machine from the New Britain Machine Company, New Britain, Conn., and from T. Robinson & Son, Rochdale, England, an automatic-feed triple-drum sander and a tenoning machine.

In all, about 1500 men are employed in the Bandoeng shops, all of whom are Javanese except 75 to 100 Chinese carpenters and pattern makers. For woodworking the Chinese have been found much more efficient than the Javanese, and their wages are correspondingly higher. Carpenters receive from 50 cents to \$1 per day; smiths about the same; foundrymen, 24 to 60 cents; boilermakers, 32 to 80 cents; machine tool men, 32 cents to \$1; painters, 32 to 60 cents, and coolies, 16 to 20 cents.

#### The Madioen Shops

Very large extensions are being made to the Madioen shops; the old buildings are being remodeled and many new ones erected. The present power is generated by a couple of simple engines of 50 hp. each from Stork Bros., Hengelo, Holland, but a hydroelectric plant is now being built a few miles away which will supply 500 hp. to the shops. As a reserve a 450-hp. steam engine has been ordered from R. Wolf, Magdeburg, Germany. This is to be of the usual Wolf design, the engine mounted on the boiler and with the fire tubes secured only to the boiler head, so that they, with the head, can be withdrawn from the barrel for cleaning and repairs. While such an arrangement might be satisfactory in a 50-hp. unit, it does not seem likely that it could prove so in a 450-hp. unit.

The new forge and blacksmith shop, which is to be 59 x 272 ft., will have 64 fires, as against 28 at present. Forges, blowers and fans have been ordered from the Sturtevant Engineering Company, London, and three Yeakley motor-pneumatic hammers of 2, 5 and 10 cwt., respectively, will be installed.

The new foundry, which is to be only slightly smaller than the smith shop, will have a 10-ton rope crane, two cupolas and five Fiat brass furnaces. Three small hand-power molding machines are to be installed. These, though ordered through a German firm, are believed to be of American manufacture.

The reconstructed boiler shop is to have an almost entirely new equipment, which will include a 20-ton electric traveling crane from the Benrath Works, Düsseldorf, Germany; an 18-ft. plate planer and two 6-ft. universal radial drills from the Niles Tool Works, Hamilton, Ohio; bending and straightening rolls from the Zimmermann shops; combined punching and shearing machine with 8-hp. motor from the Stahlwerk Oeking, Düsseldorf, and a large pipe bending machine from Sauer & Co., Germany. The only old machines which will be retained are several radial and upright drills.

It is interesting to note that while the present equipment of machine tools is almost entirely German, most of the tools ordered for the new shop are of American make. There are now from the Zimmermann shops two 4-ft. plain radials, two small universal milling machines, a small wheel press and a slotter. From the Hartmann shops there are a vertical milling machine, a slotter, two planers and several small lathes, including a turret lathe with 12-in. swing. Two wheel lathes, each swinging 6 ft., are from the Vulcan Works, Chemnitz, and there are also two 5-ft. surfacing lathes from Ernst Schiess, Germany. The other German makers represented are Brewer, of

Kalk, with a two-ram traverse shaper; J. E. Reinecker, Chemnitz, with a plain grinder, and Grafenstaden, with a couple of small capstan lathes.

The only American machines now in use are two small shapers from the American Tool Works, Cincinnati, and a plain grinder from the Landis Tool Company, Waynesboro, Pa. The only British machine on the floor is a vertical surface grinder from Beyer, Peacock & Co., Manchester.

Of the new machines ordered for this shop the following are American: One No. 3 vertical milling machine from the Cincinnati Milling Machine Company; one No. 3 universal milling machine from Kearney & Trecker Company, Milwaukee; one 5-ft. universal radial drill from the Niles Tool Works; two 2-in. bolt cutters (said to be of Landis make, though ordered through a German firm); two 12-in. shapers from the American Tool Works, Cincinnati; a slotter, with 10½-in. stroke, from the Niles-Bement-Pond Company, New York; a small turret lathe from the Warner & Swasey Company, Cleveland; two Rockford upright drills, and a universal tool grinder from the Gisholt Machine Company, Madison, Wis.

One of Geo. Richards's (Manchester, England) open-side planers has been ordered, and a precision lathe, duplicate of the one ordered for the Bandoeng shops, is to come from W. von Pittler, Germany. The price of the latter machine, which swings 10 in. and takes 24 in. between centers, is said to be \$1030. A new high-speed lathe for turning locomotive tires has been purchased from the Maschinenfabrik Deutschland, Dortmund, at a price of \$3800. This lathe, which will swing 6 ft. and is to be used with gang and formed cutters, will be driven by a 25-hp. motor, which, however, is not included in the price. Another order which has gone to Germany is for a nickel-plating machine, to be supplied by the Langbein Works, Leipzig.

All the woodworking machines now in use are from the Paris firm of Perrin & Panhard, except an automatic frame-saw grinder from a German firm. The French machines include two frame saws, two circular-saw benches, a mortising machine and a couple of planers and shapers. All of the new machines for this shop have been ordered from the Bolinders factory, Stockholm, Sweden, which will supply five log-sawing machines, five circular-saw benches, five molding machines (of different sizes and types) and mortising and tenoning machines.

When the new shops are completed and the new tools installed about 2000 hands will be employed, as against 1200 at present. Labor conditions are practically the same here as at Bandoeng.

#### The Soerabaya Shops

The shops at Soerabaya, which are small and badly arranged, are soon to be transferred from their present location at Soerabaya-Kotta to a new site at Soerabaya-Gobeng, where new buildings are now being erected. The new works, though much smaller, will greatly resemble the Bandoeng shops both in general layout and in the design of buildings, and large provision is being made for extensions when they may be required.

Although the works managers realize that most of the old machines should be scrapped rather than moved, it has been decided, since the new shops are to be so much larger than the old, to transfer nearly all of them, but with the intention of replacing them with new machines as soon as possible. These old machines include one or two traverse shapers and several upright and radial drills from such British makers as J. Whitworth, Appleby Bros., and Wayne & Co., and a number of lathes, drills and milling machines from German makers—De Fries, Zimmermann, Hartmann and Reinecker. The only modern machines in the present shop are a 16-in. engine lathe from Schumacher & Boye, Cincinnati, and a double-headed bolt cutter from the Landis Tool Company, both of which were much complimented.

A majority of the new machines are, it is said, to be of American make, though in many instances the works managers do not know the exact maker, since nearly all of the new machines have been selected from German catalogues, issued by German firms which state frankly that they endeavor to conceal from their customers the names of the makers whose machines they supply. Among the machines which the German agents have sold as American made (but maker's name not disclosed) are two

high-speed drills, two shapers, four high-speed lathes and a vertical milling machine.

The known American machines are two Rockford up-right drills, one turret lathe from Warner & Swazey, two plain grinders from the Gisholt Machine Company, a twist drill grinder from Manning, Maxwell & Moore and a slotter from the Niles-Bement-Pond Company.

The new machines ordered from European makers include an open-side planer from George Richards, a plain milling machine from J. E. Reinecker, a slow-speed cold saw from Gustav Wagner and two high-speed wheel lathes from the Maschinenfabrik Deutschland.

As it is expected that the Soerabaya shops will be occupied with light repair work rather than heavy repairs to locomotives or car building, the woodworking shops will be small, and the new foundry will have but one cupola, with a capacity of only  $1\frac{1}{2}$  tons per hour, and only two brass furnaces. The forge and smith shops likewise will be much smaller than those at Bandeong and Madioen, as there will be only 44 fires and three power hammers. Two of the latter, from the old shop, are steam driven, while the third is a new Yeakley motor-pneumatic of 3 cwt.

Wages in the Soerabaya shops average somewhat higher than in Bandeong or Madioen, but seldom exceed the maximum rates paid in those shops.

## Non-Metallic Impurities in Steel

### Enclosures Not the Simple Chemical Compounds They Have Been Thought

Vol. IV of the Carnegie Scholarship Memoirs, issued by the Iron and Steel Institute, contains several interesting papers. Among them is one by G. Röhl of Freiberg, Saxony, on "The Constitution of the Sulphide Enclosures in Iron and Steel and the Desulphurization Process." These non-metallic impurities have been studied by many workers in the last few years, and their importance is becoming more widely recognized. For instance, a few years ago Dr. Fay, of the Massachusetts Institute of Technology, read a paper before the American Society for Testing Materials, in which he brought forward much evidence in support of the view that sulphide of manganese, which is invariably present in rail steel, has an important influence on rail failures. Other papers that may be mentioned are the recent ones by Dr. Walter Rosenhain, Teddington, England, and Henry D. Hibbard of Plainfield, N. J. The chief non-metallic impurities which may occur in iron and steel are sulphides of iron and manganese, ferrous and manganous oxide, alumina and silicates of iron and manganese. The sulphides are the most important, and among these the sulphide of manganese. Sulphide of iron is a most unwelcome constituent, as has been shown by Arnold and Waterhouse, Le Chatelier and others. It brings about red shortness. On the other hand, sulphide of manganese is not brittle but plastic at a forging heat, and even at ordinary temperatures is capable of undergoing a certain amount of deformation without fracture.

Herr Röhl's paper is of great importance to all who are interested in these sulphides; that is, to every iron and steel metallurgist. First of all, pure materials were prepared. The sulphide of iron, FeS, showed 63.28 per cent. iron and 36.70 per cent. sulphur, as against 63.52 per cent. and 36.40 per cent., which are the theoretical amounts. The sulphide of manganese, MnS, was pure, except for the presence of traces of  $Mn_2O_3$ . Very many careful experiments were then carried out, using these sulphides.

Sulphide enclosures can be recognized by the well-known Baumann test, or by the older Heyn and Bauer test, where a solution of mercuric chloride and hydrochloric acid is used. For microscopical observation the prepared metal section may be covered with a layer of gelatine rendered slightly acid, to which a solution of a cadmium salt or mercuric chloride has been added. The gelatine should be applied hot by means of a glass rod. The  $H_2S$  liberated by the acid penetrates into the moist gelatine layer, and causes a precipitation of the metallic salt contained in solution. If the non-metallic enclosures have been recognized as sulphides, then arises the much more difficult question of properly deciding whether the sulphur is combined with iron or manganese. Very many etching

tests were carried out with different solutions to try to decide this question. These are fully described in the original paper. The best results were obtained by lightly etching with 1 per cent. picric acid in ethyl alcohol, followed by heat tinting until the ferrite was dark yellow. With illumination from a Nernst lamp the FeS then appeared reddish violet, and the MnS dull gray to brightish white. This reaction appears to be well adapted for distinguishing between the sulphides, and was used by Herr Röhl in his succeeding work.

The next thing taken up was an examination of the relation between FeS and MnS, to see whether or not there was mutual solubility between them. The pure MnS was found to have a melting point of 1620 deg. C., and the pure FeS, 1188 deg. C. Very many different mixtures were melted down, carefully examined, and a thermal diagram prepared. The diagram falls into two simple systems, the first between FeS and a compound  $3FeS_2MnS$  (or  $Fe_3Mn_2S_8$ ), and the second between this compound and MnS. This compound contains 60.25 per cent. FeS, and 39.75 per cent. MnS and melts at 1365 deg. C. It closely approximates pure MnS in its physical properties. The first system is of the ordinary binary alloy type, the eutectic containing 93 per cent. FeS and only 7 per cent. MnS and freezing at 1181 deg. C. The second system is one of mixed crystals, the compound and the MnS being completely soluble in each other. These facts, however, do not throw much light on the constitution of the sulphide enclosures found in steel, and to settle this point the action of MnS on the FeS-Fe eutectic must be examined. From previous work it has been established that FeS does not exist in steel as such, but as a eutectic containing about 15 per cent. iron and 85 per cent. sulphide of iron, and freezing at the low temperature of 980 deg. C. From the results of his work the author feels justified in assuming that as MnS is added to this Fe-FeS eutectic, a ternary eutectic containing a little MnS is formed, which does not freeze before 980 deg. C. This new eutectic is also very brittle and crumbly. As more MnS is added, above about 4 per cent., the compound  $3FeS_2MnS$  begins to separate until finally with higher MnS contents a solid solution is formed between this compound and the excess of MnS.

It is clear, therefore, from this carefully carried out research work that the sulphide enclosures in steel are not the simple chemical compounds they have been assumed to be. This is an important metallographic discovery and explains the discordance noticed in the results of various workers relating to appearance, melting point, etc.

G. B. W.

## Universal Cast Iron Pipe

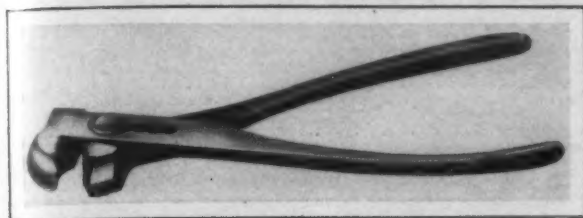
The Central Foundry Company, 90 West street, New York City, which has a number of cast iron pipe plants in various parts of the country, is conducting a campaign for the purpose of educating the trade with regard to its Universal pipe. This pipe is cast with hub and spigot ends, the contact surfaces of which are machined on a taper giving a natural iron-to-iron joint which is permanently tight. By making tapers of slightly different pitch, the joint provides for expansion and contraction, vibration and uneven ground settlement. The lengths of pipe are drawn together by bolts, two bolts of a joint sufficing except for pressures above 175 lb. The pipe can therefore be laid at slight labor cost and without calking. No molten lead or oakum is required and the only equipment needed consists of two wrenches. The company has issued several illustrated circulars treating of the special features of this pipe. One of these circulars states that the company's plants at Bessemer, Ala., and Newark, N. J., cannot supply the demand for Universal pipe and that it is now building a new plant at Holt, Ala., with a capacity of 300 tons per day.

J. G. White & Co., Inc., 43-49 Exchange place, New York, N. Y., have just received telegraphic advice of the award to their London associates (J. G. White & Co., Ltd.) of railroad construction work in Argentina amounting to about \$4,000,000 from clients for whom they have carried out several previous contracts, this new contract, like the others, being on their usual basis of cost plus a fee. The railroad to be constructed constitutes the connecting link in the through system between Brazil and Argentina, with termini at Buenos Aires and Rio de Janeiro.



### A Wrench for Round Head Bolts and Nuts

Handiness in reaching parts otherwise difficult of access and the ability to handle round head bolts and nuts were the special features considered by Ambler Holman & Co., 505 West Washington street, Chicago, Ill., in the design of their Eagle Claw wrench. As will be noticed from the



The Eagle Claw Wrench for Round Head Bolts and Nuts, Pipe, Etc., Made by Ambler, Holman & Co., Chicago, Ill.

accompanying engraving, the jaws of the wrench are set at an angle of 45 deg. with the handles. These jaws are adjustable to various widths of opening and there is a notch in the end of the jaw so that a small nut can be gripped in a position that would be inaccessible to the ordinary wrench or pliers in many instances. While this tool was designed for the use of automobile repairmen, at the same time it can be used in the machine shop and other places where a pipe wrench, a monkey wrench, pliers or tongs can be used. It further meets the requirements of a wrench for agricultural implements, the need for which was set forth in a recent communication to *The Iron Age* by an exasperated machinist.

In addition to the type illustrated the wrench is made in a number of different styles with various shapes of jaws so that they can grip the end of a bolt or pipe without damaging the thread of the former or crushing the latter. They are also said to be equally applicable to the removal of hexagonal nuts without damaging the corners.

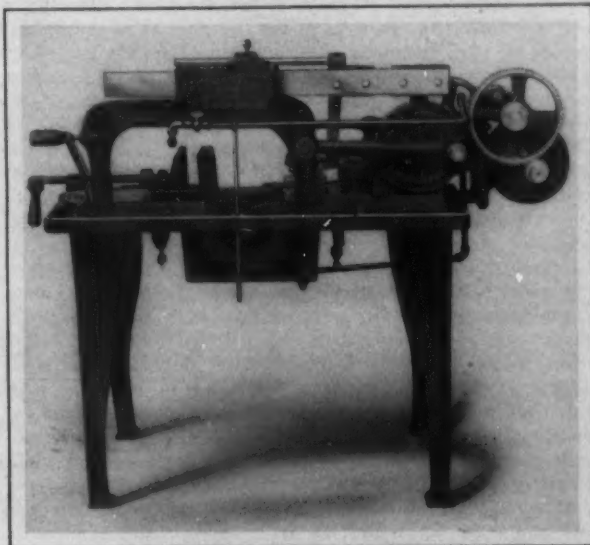
### The Deforest Sheet & Tinplate Strike

A strike occurred November 19 at the plant of the Deforest Sheet & Tinplate Company at Niles, Ohio, but it lasted only a few days. W. A. Taylor, president of the company, states that while it affected about 150 of the employees, out of a total of over 600, it was not actively participated in by more than 35 or 40, who stopped operations on the hot mills. The excuse given the management for the walkout was based on a misinterpretation of the Amalgamated scale, but the contention was palpably wrong and was so declared by the national officials of the Amalgamated Association. It is suspected that the intention of the strikers was to disrupt the Amalgamated Association organization in Niles, and supplant it with a new labor organization, purely local, or perhaps to be affiliated with some national labor movement outside of the Federation of Labor. If the walkout at the Deforest mill was for the purpose of such a test, it proved conclusively that there is practically no sympathy in Niles for any movement having for its purpose the affiliation with any new and untried national labor organization, as over half the affected employees sent word to the management within the first 24 hours that they were ready to go back to work, and before the end of the week there were not more than 10 who had not sent such word. The walkout occurred at 8 p. m. and the management then put out all fires and made no effort to resume operations that week, taking advantage of the opportunity for making some needed repairs in connection with steam and water lines, which would otherwise have been done during Christmas week.

On Saturday, November 23, all employees who walked out were paid in full to date, and no preparation for resuming operations was made by the management until after it was waited upon by two committees, one representing those loyal to the Amalgamated Association and the other representing the seceders. Both committees requested that the mill resume operations at once, and the Amalgamated adherents included in their request that all former employees, including the seceders, be given back their jobs. This was agreed upon and the plant resumed operations in all departments on Monday morning, November 25, at 8 o'clock. Both factions among the men seem now to be pulling together in perfect harmony.

### A New Robertson Hack Saw Machine

A recent addition to the line of hack saw machines built by the W. Robertson Machine & Foundry Company, 32 Greenwood place, Buffalo, N. Y., is the No. 3 Economy motor-driven machine. This machine operates on the draw-cut principle and is equipped with the builder's mechanical lift on the return stroke, which also forms a feature of the No. 2 and No. 1 machines which were illustrated in *The Iron Age*, May 30 and October 10, 1912, respectively. The capacity of the machine is 6 x 6 in. and it will use a blade varying in length from 10 to 14 in. A friction band clutch in the driving gear is employed for starting and there is an automatic device which stops the machine as soon as the cut is completed. A rotary brass pump, for forcing cooling liquid from the tank to the saw



The No. 3 Economy High Speed Motor-Driven Hack Saw Machine Built by the W. Robertson Machine & Foundry Company, Buffalo, N. Y.

blade, is geared to the pinion on the motor armature. The motor is back geared and compound wound. It can be furnished for use on either direct or alternating current circuits. With this exception, the construction is the same as the builder's No. 2 machine.

### The Crucible Steel Company's Coal Mines

The Crucible Steel Company of America, Pittsburgh, through the Crucible Coal Company, an identified interest, is about to open the first coal mine in coal fields in Greene County, Pa., which have hitherto been undeveloped. An extension of the Pittsburgh, Virginia & Charleston Railroad is being built to a mine of the company, located at Rice's Landing. Four other coal mines in the county, owned by the company, will probably be opened some time later. The coal from the Crucible mine at Rice's Landing will be shipped in steel barges down the Monongahela River to Midland, Pa., where the blast furnaces, open-hearth steel plant and finishing mills of the Pittsburgh Crucible Steel Company, a subsidiary interest, are located. A large number of bee-hive coke ovens are being built at Midland, the intention being not only to make coke for the blast furnace, but also to utilize the by-products. When impracticable to use the river, shipments of coal to Midland will be made by rail.

The tract owned by the Crucible Coal Company in Greene County consists of 2500 acres of what is believed to be fine coking coal. At the main shaft at the Crucible mine, hoisting engines, boilers and other machinery have been installed. There are three 300-hp. boilers, and provision has been made to accommodate two more, making a total of 1500 hp. The fuel bins are of the latest design. All the shafts are concrete lined, while the hoisting and material shafts, known as Nos. 1 and 2, are equipped with the latest type of Lepley cages. Special provisions have been made to supply plenty of air to all the mine workings. The fan house is constructed of concrete, and is so built as to withstand the most severe shocks. The fan has a capacity of 700,000 cu. ft. when driven at a speed

of 150 r.p.m. The tippie at No. 1 shaft is built entirely of steel and is 72 ft. high. All the appliances on the tippie are electrically operated, while motors will be used to gather the coal in the mine.

## The Case of the Continuous Foundry\*

Savings Compared with Hand Operating Conditions on Basis of Known Costs

—BY GEORGE K. HOOPER,†—

The idea is very prevalent that the continuous system can be used only by manufacturers producing but a single product. This is an erroneous idea. As a matter of fact foundries, even when producing but one line of product, have a great variety in patterns and sizes, and these varying patterns are as a rule put as far as possible into molds of uniform size. It is true that the first successful systems were developed to handle a single line of product, probably because it was felt that the uniformity of the castings would render the problem easy of solution. It is doubtful if the designer realizes how great and important was the uniformity of the molds, irrespective of the kind of castings produced. At any rate it must be obvious that what they have done with a given number and size of molds any one else should now be able to do.

Every foundryman will realize that the variation is not great in the time of making many of the molds in his plant, even though the patterns may vary considerably in magnitude and complication. A glance at his piece-work rates would probably show him that he has patterns of widely varying size and form for which he pays the same rate per mold, which means that the same number of molds of each pattern are put up per day. For all practical purposes, so far as foundry labor is concerned, these patterns can be considered on a uniform basis. Experience proves, however, that exact uniformity in size and shape of molds is not necessary for the application of the continuous system, as slight variations of form and speed in the mold conveyor enable it to handle properly wide variations in form and number of molds. On the first system with which I had to do, the molds varied 100 per cent. in weight and about 40 per cent. in time required in making, and these variations were perfectly accommodated by the system. Also there was considerable variation in pattern, so that the apparatus and men were called on to handle a considerable variety of work. In considering continuous operation the mold is the unit on which the functions of the apparatus are based.

In a foundry recently investigated, operating on a general line of machinery castings, the comparison made in the accompanying tables exists.

### Hand Operating Conditions.

Production per day .....	12,000 molds
Space occupied .....	18,000 sq. ft.
Days run per year .....	300
Molding machine operatives .....	112
Average production per molding machine hand per day ..	108 molds
(NOTE.—Maximum product, 209. Minimum product, 62.)	
Average foundry loss .....	5 per cent.
Average earning per day of molding machine hand ..	\$2.47
(NOTE.—Shaking out, tempering and cleaning up are done by a separate laboring gang with one laborer to six molding floors.)	
Average cost per mold, including cost of laboring gang ..	\$0.0259
Average cost per operative of individual equipment, such as molding machines, bottom boards, flasks, bands, weights, etc. ....	\$225
Total cost of above individual equipment .....	\$25,200
Heats per day .....	2

### Continuous Operating Conditions.

NOTE: Since two heats per day are run in this foundry, the floor space is more advantageously used than with one heat per day, and the saving in floor space is about one-third instead of one-half.

Space occupied .....	11,500 sq. ft.
Production per day .....	12,000 molds
Cost of conveyors, motors, hoppers, etc., installed including power plant .....	\$35,000

### Figuring the Saving of the Continuous Foundry

From experience in this general character of work, there should be an average increase in efficiency in this plant by continuous operation of 40 per cent. since the

present methods are low in efficiency. This represents a decrease in labor cost per mold, taking due account of laboring gang and other assistance, of \$0.0074 per mold. [0.0259 — (0.0259 ÷ 1.4).]

### Comparison of Operating Costs.

12,000 molds per day, daily saving @ 0.74 cent is .....	\$88.80
Taking account of previously mentioned 5 per cent. loss of running time, this would yield 285 days running time per annum. The total labor saving per annum then is .....	25,308
Saving in fixed charges on floor space saved at 12 per cent. per annum (18,000 — 11,500) × \$2 × 12 per cent. ....	1,560
Saving in fixed charges on individual equipment saved at 20 per cent. per annum. \$25,200 × 40/140 × 20 per cent. ....	1,440
Saving in foundry loss per annum at 1/2 of 5 per cent. is 1/2 × 5 per cent. × 12,000 molds × (0.0259 + 100 per cent. fixed charges) × 285 days .....	2,952
Total savings per annum .....	\$31,260

To be deducted from this will be operating charges as follows:

Interest and depreciation at 20 per cent. per annum on investment of \$35,000 .....	\$7,000
Power .....	2,750
Repairs and replacements .....	800
Total annual charge .....	\$10,550
Net saving will be therefore \$31,260 — \$10,550 .....	\$20,710
This represents on the investment in apparatus of \$35,000 .....	60 per cent.

Should it be found necessary to build an entirely new casting shop adjacent to a present foundry plant, the building and equipment cost would be somewhat increased and may be assumed as follows:

Floor space 11,500 sq. ft. at \$2 .....	\$23,000
Individual equipment 100/140 × \$25,200 .....	18,000
Conveyors, motors, power plant, etc. ....	35,000
Cupola and miscellaneous apparatus .....	9,000
Total investment .....	\$85,000
Hence the \$20,710 saving represents on the investment in a new casting plant nearly .....	25 per cent.

### Figuring Minimum Profitable Size for Continuous Operation

An interesting question of course is, what is the minimum number of molds on which this apparatus could be profitably operated? Assume that a foundryman would not be willing to install any apparatus which would return him a smaller average saving than 10 per cent. on his total investment; then if the apparatus can be put into an existing plant which would involve \$85,000, less the cupola and miscellaneous apparatus on hand amounting to \$9,000, the investment in the plant would be \$76,000, and we have the following charges:

10 per cent. of \$76,000 .....	\$7,600
Interest and depreciation charges as before .....	7,000
Due to smaller output power would be 80 per cent. of \$2,750 .....	2,200
And repairs 90 per cent. of \$800 .....	720
Gross saving which must be made .....	\$17,520

Then since \$31,260 is the gross saving on a product of 12,000 molds per day, the number of molds necessary to make a gross saving of \$17,520 is  $17,520 \div 31,260 \times 12,000$  or say 6725 molds per day. A production of 6725 molds per day would therefore be the rate of operation of a 12,000 mold apparatus still returning 10 per cent. on the investment.

It is obvious that an apparatus designed for about 5000 molds would cost considerably less than \$35,000, and its repairs, housing and power costs would also be less than the figures previously given and the saving to be made would be considerably more than 10 per cent.

### The Next Five Years' Development

It is beyond question that the experimental period of this method of working can reasonably be considered as ended. It will be found that there are enough systems in successful use, extending over a long term of years, to warrant the belief that there is no difficulty in designing apparatus for handling any particular product. I believe from experience and study that the foundryman who is making upward of 5000 molds of fairly uniform size per day at any efficiency less than 50 per cent. (and this includes practically all who are using hand methods), will be behind the times and unable to compete if in the coming five years he does not equip his plant for operation in this way. He is in fact losing money to-day, as the foregoing figures show.

\*From a paper read before the recent meeting in Buffalo of the American Foundrymen's Association.

†Hooper-Falkenau Engineering Company, 165 Broadway, New York City.



## New Members of the American Iron and Steel Institute

At their meeting on November 22 the directors of the American Iron and Steel Institute considered 73 nominations for membership in the institute. Of these five were passed over for the present and the following 68 persons were elected:

William M. Bailey, Pittsburgh, secretary to president Carnegie Steel Company.

Richard W. Bailey, Pittsburgh, division contracting manager American Bridge Company.

Duke N. Banks, Pittsburgh, American Steel Foundries.

Edward L. Billingslea, Chicago, Rogers, Brown & Co.

Louis E. Booth, New Haven, Conn., superintendent New Haven works American Steel & Wire Company.

Lee H. Bowman, Pittsburgh, special engineer armor department Carnegie Steel Company.

G. D. Chamberlain, Braddock, Pa., chief chemist Edgar Thomson works Carnegie Steel Company.

Daniel M. Clemson, Pittsburgh, president Carnegie Natural Gas Company.

Charles L. Close, New York, manager Bureau of Safety United States Steel Corporation.

Frederick Crabtree, Pittsburgh, professor Carnegie Technical Schools.

David T. Croxton, Cleveland, president Cleveland Furnace Company.

David Dows, New York, engineer American Grondal Company.

John Duncan, Wheeling, W. Va., general manager sales Wheeling Steel & Iron Company.

Joseph R. Bates, Pittsburgh, manager sales American Sheet & Tin Plate Company.

Edwin H. Broden, Rankin, Pa., assistant superintendent Rankin works American Steel & Wire Company.

Robert Geddis, Pittsburgh, assistant general sales manager Jones & Laughlin Steel Co.

Roland Gerry, Pittsburgh, assistant general sales manager Jones & Laughlin Steel Company.

James H. Gray, New York, metallurgist United States Steel Corporation.

Howard M. Hanna, Jr., Cleveland, M. A. Hanna & Co.

Charles N. Hickok, Cleveland, coke salesman M. A. Hanna & Co.

Walter B. Higgins, Steubenville, Ohio, assistant secretary and assistant manager of sales La Belle Iron Works.

Kinney C. Hoxie, Duluth, Minn., chief engineer Minnesota Steel Company.

John W. Hubbard, Pittsburgh, manufacturer.

F. W. Hutchings, Detroit, Mich., treasurer Lake Superior Iron & Chemical Company.

A. H. Hutchinson, Chicago, assistant to superintendent Grand Crossing Track Company.

William A. James, Buffalo, New York, chief engineer Lackawanna Steel Company.

James E. Jones, South Chicago, Ill., roll designer Illinois Steel Company.

Richard Jones, Jr., Youngstown, Ohio, secretary and general counsel Republic Iron & Steel Company.

John W. Kreitter, Proctor, Minn., superintendent Duluth, Misabe & Northern Railroad Company.

Augustan M. Lally, Pittsburgh, manager sales National Tube Company.

Alex Laughlin, Jr., Pittsburgh, vice-president Central Tube Company.

Charles McKnight, Pittsburgh, president Carbon Steel Company.

Reuben E. McMahon, Cleveland, pig iron salesman M. A. Hanna & Co.

A. K. McMillen, Pittsburgh, chief engineer Alex Laughlin & Co.

Wm. E. Manning, Youngstown, Ohio, assistant general manager of sales Youngstown Sheet & Tube Company.

Carl A. Meissner, New York, metallurgist United States Steel Corporation.

Edwin S. Mills, Chicago, special sales agent Carnegie Steel Company.

James G. Mustin, Braddock, Pa., superintendent Rankin mill American Steel & Wire Company.

Albert D. Neal, Munhall, Pa., metallurgist Carnegie Steel Company.

George W. Niedringhaus, Granite City, Ill., vice-president National Enameling & Stamping Company.

John S. Patterson, Pittsburgh, vice-president Enameled Metals Company.

William G. Pearce, New York, president Manganese Steel Rail Company.

Charles Page Perin, New York, engineer.

Harry W. Petty, Pittsburgh, American Steel Foundries.

James S. Phifer, Allentown, Pa., superintendent Allentown works American Steel & Wire Company.

Jose A. Ruiloba, New York, metallurgist United States Steel Corporation.

William F. Rust, Youngstown, Ohio, chief engineer Youngstown Sheet & Tube Company.

William T. Shannon, Cincinnati, manager sales American Sheet & Tin Plate Company.

MacGilvray Shiras, Pittsburgh, ore agent Carnegie Steel Company.

B. R. Shover, Youngstown, Ohio, superintendent Brier Hill Steel Company.

James A. Smith, Jr., Detroit, Mich., manager sales American Sheet & Tin Plate Company.

George T. Snyder, McKeesport, Pa., mechanical engineer National Tube Company.

Charles R. Sturdevant, Worcester, Mass., engineer American Steel & Wire Company.

William J. Sullivan, New York, secretary to president United States Steel Corporation.

Benjamin Talbot, Middlesbrough, England, managing director Cargo Fleet Iron & Steel Company.

Charles D. Terry, Pittsburgh, assistant general superintendent National Tube Company.

George Thomas, 3d, Parkersburg, vice-president and treasurer Parkersburg Iron Company.

J. Earlston Thropp, Jr., Indiana Harbor, Ind., superintendent blast furnaces Inland Steel Company.

David Tod, Youngstown, Ohio, director Brier Hill Steel Company.

Enrique Touceda, metallurgist and professor of metallurgy Rensselaer Polytechnic Institute, Albany, N. Y.

Francis L. Toy, Munhall, Pa., metallurgist Carnegie Steel Company.

Edward H. Utley, Pittsburgh, vice-president and general manager Bessemer & Lake Erie Railroad Company.

John C. Vollman, Salem, Ohio, superintendent Salem works American Steel & Wire Company.

John C. Walker, New York, metallurgist United States Steel Corporation.

Walter E. Watson, Steubenville, Ohio, assistant general manager of sales La Belle Iron Works.

William J. Wetstein, St. Louis, manager sales American Sheet & Tin Plate Company.

Charles Van Cise Wheeler, Washington, D. C., superintendent Washington Steel & Ordnance Company.

Dwight E. Woodbridge, Duluth, Minn., mining engineer.

## World Wide Prosperity

The world's international commerce, all exports and imports, will establish a new high record in 1912, present indications being that the total will aggregate 35 billion dollars, against 31 billion in 1910, 20 billion in 1900 and 17½ billion in 1890, having thus doubled in 22 years. These figures are the result of a compilation from the official publications of about 70 leading countries recently made by the Statistical Division of the Bureau of Foreign and Domestic Commerce. Nearly all the important countries show larger totals for 1912 than in 1911 or any earlier year. Practically every country increased its exports. The total value of imports into the 70 principal countries and colonies of the world in 1911 approximately 17 2/3 billion dollars. Deducting from this the imports of the United States leaves a total of 16 billion dollars as the value of the foreign market in which American products and manufactures may be sold. Of this total of 16 billion, imports from the United States amounted to 2 billion, or one-eighth of their total imports. The largest markets for American products, measured by their valuation of imports from the United States, are the United Kingdom, 572 million dollars; Canada, 285 million; Germany, 283 million; France, 119 million; Netherlands, 117 million; Italy, 70 million; Cuba, 57 million; Mexico, 56 million; Austria-Hungary, Argentina and Belgium, between 45 and 50 million each, and Australia, Brazil, Russia and Japan amounts ranging downward from 32 to 27 million dollars.

The Interstate Commerce Commission has granted permission to the Louisville & Nashville Railroad and participating carriers to establish the same rate on muck bars, blooms, billets, slabs, crop ends, ingots, wire rods, and sheet bars or bars of steel, from Birmingham, Ala., and group, to Carnegie, Pa., without observing the long and short haul provision of the fourth section of the act to regulate commerce. Under this ruling of the commission, Carnegie will receive the same rate on the products named as Pittsburgh, or \$4.90 per ton of 2240 lb.

Fire was lighted December 2 in the Tuscaloosa furnace of the Central Iron & Coal Company, at Holt, Ala., which has been out of blast for a number of months and has been reconstructed.

# THE IRON AGE

Published Every Thursday by the

**David Williams Company**  
239 West 39th Street New York

W. H. Taylor President and Treasurer  
I. A. Mekeel First Vice-President  
Fritz J. Frank Secretary  
M. C. Robbins General Manager

## Editors

Geo. W. Cope A. I. Findley W. W. Macon

Charles S. Baur Advertising Manager

## Branch Offices

Chicago: Otis Building Philadelphia: Real Estate Trust Bldg.  
Pittsburgh: Park Building Cleveland: American Trust Building  
Boston: Compton Building Cincinnati: Mercantile Library Bldg.

Entered at the New York Post Office as Second-class Mail Matter

Subscription price: United States and Mexico, \$5.00 per year; to Canada, \$7.50 per year; to other foreign countries, \$10.00 per year.

## CONTENTS.

A Coupon Card System for Labor Records.....	1311
German Practice with the Friedrich Changeable Port.....	1312
Dodge Pulleys for Exacting Service.....	1313
Germany's September Exports.....	1313
Automatic Trimming and Curling Machine.....	1313
Adopting Piece Work and Premium Systems.....	1314
Lake Iron Ore Shipments for 1912.....	1315
A 21-In. Gap Bed Engine Lathe.....	1315
Influence of Pouring on Quality of Steel.....	1316
Are Profits a Proper Measure of Efficiency?.....	1318
A Large Inserted-Tooth Metal Saw Blade.....	1319
Suggestions from the Daimler Motor Works.....	1320
A Power Press for Manufacturing Work.....	1321
Modern Steel Foundry Practice.....	1322
An Improved Type of Safety Lathe Dog.....	1322
Monorail Switch with a Fixed Tongue.....	1323
Drilling Machine for Boiler Shells.....	1323
Conserving the Data of Scientific Management.....	1324
A New Royersford Grinding Machine.....	1325
The Dispatching System for the Foundry.....	1326
Combination Boring and Milling Machine.....	1328
Electricity from Steam from Drop Forges.....	1329
A Vertical Clamp for Handling Boiler Plates.....	1329
State Railroads of the Dutch East Indies.....	1330
Non-Metallic Impurities in Steel.....	1332
Universal Cast Iron Pipe.....	1332
A Wrench for Round Head Bolts and Nuts.....	1333
The Deforest Sheet & Tinplate Strike.....	1333
A New Robertson Hack Saw Machine.....	1333
The Crucible Steel Company's Coal Mines.....	1333
The Case of the Continuous Foundry.....	1334
New Members of the American Iron and Steel Institute.....	1335
World Wide Prosperity.....	1335
Arbitration in Labor Disputes.....	1336
Reducing Short Time Absences from Work.....	1337
Fallacies in Reckoning Labor Costs.....	1337
The Twist Drill Trade.....	1338
Mail Order Houses Becoming Manufacturers.....	1338
The Annual Review Number of <i>The Iron Age</i> .....	1338
No Tariff Legislation This Winter.....	1338
Steel Works Project for Port Arthur.....	1339
Labor Troubles at Carnegie Steel Plants.....	1339
Sand Freight Rates Attacked.....	1339
Youngstown Sheet & Tube Equipment Contracts.....	1339
New High Rate in Pig Iron.....	1340
Test of a Steam Boiler Equipped with Steam Air Jets.....	1341
Cleveland Foundrymen Given the Story of Iron.....	1341
Watson-Stillman Company Improvements.....	1341
The Iron and Metal Markets.....	1342
The Syracuse Iron Mine—A Correction.....	1355
Personal.....	1355
The Hess-Bright Manufacturing Company's New President.....	1356
Obituary.....	1356
Pittsburgh and Vicinity Business Notes.....	1356
Reported Iron Ore Discovery in Mexico.....	1356
The Mechanical Engineers' Meeting.....	1357
Customs Decisions.....	1357
Keystone Bronze Company Expanding.....	1357
Melting Iron in the Cupola Furnace.....	1358
Judicial Decisions of Interest to Manufacturers.....	1360
New Tools and Appliances.....	1361
The Machinery Markets.....	1362
Trade Publications.....	1370

## Arbitration in Labor Disputes

Discussing the effort to establish compulsory arbitration under state control in Great Britain, the London Engineer attacks with vigor the increasing tendency toward government intervention in disputes between capital and labor. The writer takes the ground that where the state maintains conciliation boards, the labor agitator is relieved of much of the responsibility for inciting dissension between his people and the owners. He points to the fact that already this government policy has caused an increase rather than a decrease in the number and seriousness of labor troubles.

Many employers in the United States take a similar view of government interference, and especially do they combat the idea of a compulsory system. The owner of a small factory might very naturally resent being compelled by law to submit any demand of his workmen, no matter how extraordinary, to a government board. In the case of a strike where the issue is the open shop, the question could not be given to outsiders for a decision. They could not equitably order the owner to submit to the union's control of his works; to restrict the number of his apprentices; to establish a minimum wage, and to recognize a union shop committee. Where the issue is one of wages alone, the parties to the dispute may find it expedient to leave the matter to arbitration. Managers sometimes welcome such an investigation of the affairs of their company, because of the resulting education of their employees as to the costs of production and the limit which must be put upon wages if the business is to be conducted at a profit. Nor should the workman, as an independent unit, be compelled by law to submit to terms which he cannot believe to be fair. His right to treat directly with his employer is one not to be cast aside lightly. The compulsory idea conflicts with the American sense of fitness, excepting, perhaps, as it may affect public service corporations, in which the government has tangible rights of regulation, in exchange for favors granted. Of the experience in Great Britain, the Engineer says:

We are drifting to a state of society in which no man will be free to bargain with another man, in which even an employers' association will not be able to have an agreement with a labor union save on lines laid down by some board of commissioners or board of bureaucrats. \* \* \* \* \* Surely with our universal education, our freedom of speech and meeting and organization, we ought to have more and not less free bargaining. Yet just as men and classes of men are learning more and more how to defend their rights, how to organize for improvements, and how to bargain with their employers, for instance, we find a paternal state stepping in more frequently, not merely to conciliate but to dictate. This interference would all be very well if it were successful. But it is not successful. Is it not remarkable that just as the state has increasingly interfered between employers and workmen, so have strikes grown in number and magnitude? We have more strikes and bigger strikes since the industrial council was established than we had before. And this is more than a coincidence. It is a case of cause and effect. Let it be known that capital and labor must settle their own differences, and the leaders on both sides, to say nothing of the rank and file, will weigh up the merits and demerits of their disputes, calculate the forces of the opposition likely to be encountered, and duly appreciate their responsibilities before resorting to extreme measures. But let it be known, as is now the case, that no matter how extravagant the demands may be on the one side, or how unreasonable the refusal of concessions on the other, that no matter on what pretext a strike or lock-out is declared, if the worst comes to worst the govern-



ment will step in and afford a dignified retreat for the transgressors, and you at once put a big premium on industrial anarchy.

The worst type of agitator thrives on government interference. If a strike is successful the agitator claims the credit. If the strike is unsuccessful, he blames the government. If the government kept out, both credit and blame would go to those responsible, and in the knowledge that it would be so the leaders on both sides would count the cost and consider the consequences more carefully. It was the idea that the government would interfere that made the national coal strike possible. It was the promise of government intervention and legislation that prolonged the strike. It is the resultant legislation that is causing most of the trouble to-day—troubles more real than anything experienced before the strike. The minimum wage act is proving illusory—as it was bound to do—but the government, the joint boards, the independent chairmen, the coal owners, anybody and everybody, are blamed for the prevailing discontent, save the leaders and outside agitators who got up the ridiculous minimum wage movement.

Had there been no promise or hope or idea of government intervention either the national strike would not have been organized, or those responsible for it would have been discredited by now. But the strike was got up by agitators, relying on the government to do something if the enterprise proved unsuccessful in itself, and now that both the strike and the action of the government have failed to benefit the miners the same agitators are in the same positions, at the head of the labor movement, carrying on the same old game, the troubles of the miners being ascribed to anything or anybody but the real culprits. Depend upon it, the more industrial peace machinery the state sets up—the more government conciliators and arbitrators we get—the more wars we shall have between employers and employed.

The most pointed proposal of compulsory arbitration thus far made in this country was that in the majority report last week of the board of arbitration in the case of the locomotive engineers. P. H. Morrissey, representing the engineers, strongly opposed the suggestion on the ground that it would "shackle the rights of a large group of our citizens." What has happened in England is not likely to advance but rather retard the adoption of measures for state interference in labor disputes in this country, where employers and employees alike look with disfavor on such extension of the powers of centralized government.

### Reducing Short Time Absences from Work

In the effort to keep down production losses which result from the failure of employees to appear for work, the short time absence is a perplexing industrial problem. Some large manufacturing establishments have created systems for following up absentees, with an official whose special duty it is to visit the homes of delinquents and investigate the reasons for their idleness. One purpose is that the workmen shall have proper medical attendance, in case he is disabled by sickness or accident. Another is to get after the chronic absentee, who shirks his labor because of laziness, or because he wishes to take time for personal pleasure. As has been pointed out in a previous article, the system works to decrease very materially the percentage of idle hours of men and equipment. Where no such organized effort is made this loss is large, much larger than most owners realize. In one plant a specialized system, which includes also medical inspection, has resulted in a reduction of this form of waste to considerably less than 2 per cent. Recently, however, the percentage was seen to increase slightly, and an investigation was made to ascertain the cause,

which was presumed to be an increasing amount of sickness among the men. But the condition was found to be one of general well-being. The fault rested in the number of men who had been absent a day or half a day at a time, cases which for lack of intervening time had not reached the follow-up investigator.

The control of short-time absences should be given careful consideration by employers. With individual records of all employees the sum total of absent hours of each is determined easily, and an analysis shows whether these losses consist of long or of repeated short periods. Where a man is too ill to do his work, or has met with an incapacitating accident, his total of idleness for a year may be high, but naturally would be considered unavoidable and would be treated as such. On the other hand, if an individual's record should prove that he has been off duty a day or a half day on repeated occasions, he would be a good subject for a warning from his superintendent or foreman. Short absences are more demoralizing to the industrial organization than the longer ones. If a workman is away from his machine or bench for a week or a fortnight, the probability of an extended absence is usually known to the foreman in the beginning, and another man can be put on the job, if necessary, in order not to disturb the balance of production. It is a different matter, however, where an employee is away a few hours only. A week's total of non-productive hours accruing from the idleness of a dozen men is much more costly than if one employee is absent for the entire six days.

### Fallacies in Reckoning Labor Costs

A controversy has arisen between Professor Fisher of Wesleyan University, Middletown, Conn., and a number of prominent manufacturers of Connecticut as to the percentage relation of the item of labor to the total cost of production. Professor Fisher is quoted as stating that labor should be charged with less than 20 per cent. of total cost, while manufacturers of New Britain, Bristol and other centers have found from their own experience that it runs from 40 to 85 per cent., varying with the class of goods. For example, with the American Hardware Corporation labor cost is 50 to 70 per cent.; with Landers, Frary & Clark, 70 to 80 per cent., and with the New Departure Mfg. Company as high as 85 per cent. Professor Fisher's estimate is made the basis of an argument favoring radical reductions in tariff on the manufactured products of the State.

The last word in the discussion is an open letter by Col. Charles M. Jarvis, president of the American Hardware Corporation, in which he takes Professor Fisher to task for various statements published by him in the Connecticut press. Especially does Colonel Jarvis resent the insinuation of the following:

As salaries include the excessive payments often made to insiders in order to cover or reduce profits, they should not in minute accuracy be entered at their full amount as part of the expenses of production.

Similar claims have been made many times by those who are not in touch with the affairs of large corporations. It is a convenient recourse. If the statement were true, this element would inflate production costs in a large way. Fortunately, however, such a case is extremely rare. Academic arguments on industrial matters are prone to include statements of this character. In the present instance the basis of

deduction—that labor cost is less than 20 per cent.—is wide of the figures taken from the exact cost records of the manufacturers. Colonel Jarvis expresses himself on the subject as follows:

Professor Fisher would have us believe that the manufacturers of Connecticut are in the habit of covering up their profits by paying to themselves exorbitant salaries. A very large part of the manufacturing industries of Connecticut are carried on by joint stock corporations. I think it a safe statement to make that not less than 50 per cent. of the capital stock of these corporations is owned by widows, orphans and estates that depend upon the income from these stocks for their living. The officers of these corporations are the servants of the stockholders, and any official of any of these corporations who should be guilty of taking an excessive salary in order "to cover or reduce profits" would be as guilty of theft as a defaulter in a national bank or a treasurer of one of our savings institutions who appropriated to his own use any part of the assets of the institution. \* \* \*

I have been connected with the manufacturing industries of Connecticut for more than thirty years. With a large acquaintance among manufacturers of Connecticut, and with more or less of an intimate official connection with a large number of our manufacturing industries, I make the statement deliberately that never have I known of any such condition as asserted by Professor Fisher. I do not believe that the manufacturers of Connecticut, singly or collectively, are guilty or ever have been guilty of any such thing.

Let every person that reads this communication think over for himself the manufacturers of his acquaintance. Are they not men of honor, integrity—are they not the leaders in every good work in the community in which they live—are there any better men on the face of the earth than these same manufacturers that Professor Fisher would have us believe are guilty of the practice he charges? Take these same manufacturers out of any community in our State and every citizen knows that our churches would be more or less depopulated and that the philanthropic work in which every community engages would be seriously crippled.

The effect of such statements as are characterized above, coming from so-called economists, is to intensify a class feeling that has never been so played on by designing men in public life as in the past two years. Slow-paced, and long after the political campaigns in which attacks on the manufacturer do their work so well, comes the campaign of education in his real relation to the common prosperity. The lesson in community of interest is generally learned once in 20 years at least, and for the most part it is learned painfully.

### The Twist Drill Trade

The tendency toward increased shop efficiency with the object of getting a larger product without increasing the amount of machinery equipment is illustrated in the increasing demand for twist drills of high speed steel. The sales record of a leading twist drill manufacturing establishment in the Central West for the past four months shows that about one-third of its sales in volume were high speed steel twist drills and two-thirds were carbon steel drills. In the corresponding period of 1911 only about one-sixth of the volume of sales were high speed steel drills. These figures show that the demand for high speed steel drills as compared with carbon steel drills has doubled in a year. As the selling organization of the company referred to made no special efforts to place its high speed steel drills on the market as compared with its carbon steel drills, it is believed that its experience in finding a growing demand from the trade for the higher class drills is being duplicated by other manufacturers. The

more general use of high speed steel drills is resulting in an increased demand for heavier and more rigid machinery that can stand the increased speed required and that will permit the use of such drills without breakage.

### Mail Order Houses Becoming Manufacturers

The manufacturers who have been cultivating the business of the mail order houses will take little satisfaction in observing the entrance of those houses into the manufacturing field. Early in their history these houses made close affiliations with manufacturers in certain lines, notably stoves, taking a foundry's entire output. The facilities for distribution enjoyed and the tremendous growth in this kind of business have made these merchants ambitious to extend as manufacturers into other branches which are probably believed to present opportunities for greater profit than by simply acting as distributors. The latest venture in this line is a plant for the exclusive manufacture of saws which is now being erected in Chicago by a mail order house of that city.

### The Annual Review Number of "The Iron Age"

Announcement was made on November 30 that no further advertising could be accepted for the Annual Review Number of *The Iron Age*, to be issued January 2. It was found that after allowing for the large amount of reading matter scheduled for that number, it would be inadvisable to increase its bulk further, as that might interfere with its delivery by mail carriers in the usual way. It is believed that technical and trade journalism has no precedent for this limitation of advertising space and that in no other case has similar ground existed for taking such action.

### No Tariff Legislation This Winter

WASHINGTON, D. C., December 3.—It is now settled that the Ways and Means Committee will not report any bill or bills revising the tariff at the present session of Congress. Representative Underwood, chairman of the committee, in reply to queries from your correspondent, states that the committee will not take up tariff legislation at this session, but will give hearings to those interested, beginning probably after the holiday recess, or the first week in January. Mr. Underwood states that it has not been decided whether the tariff will be revised schedule by schedule or in the form of a general bill and added that either way would be satisfactory to him. He also stated that revision would be along the lines of the bills reported by the Ways and Means Committee, passed by the House and Senate, and vetoed by the President.

It is Chairman Underwood's plan to give hearings and to have tariff measures ready to report to the House on the first day of the extra session to be called by President-elect Wilson. No date has been fixed for the assembling of the extra session, but it is believed that it will not be later than April 15.

Senator Simmons of North Carolina, the ranking Democratic member of the Senate Finance Committee, which committee has charge of tariff matters, and who will in all probability be chairman of the committee beginning with the extra session, has issued a brief statement in which he says: "I do not believe that a very long time will be required to put through the tariff legislation. I expect that the bills will come over to the Senate from the House one after the other, each revising a particular schedule, but I do not know positively what plans Chairman Underwood and his colleagues have made. I believe that generally the new legislation will follow very closely the lines of the bills passed in the present Congress. Of course some changes will be necessary."

The Democratic leaders of both House and Senate will confer with President-elect Wilson before deciding upon a programme with regard to tariff and other important legislation in the extra session.

W. L. C.



## Steel Works Project for Port Arthur

The Industry to Be Based on the High-Sulphur Ores of the Atikokan District

DULUTH, MINN., November 30, 1912.—A rather unusual project is in contemplation by the Canadian Northern Railway, which on its way to Lake Superior crosses the Atikokan district. This has been termed an iron ore district, which it is not, strictly speaking. Its ores are somewhat similar to those of the Sudbury district, though they lack the nickel content that makes the latter so valuable. Some years ago Canadian Northern interests built a small blast furnace at Port Arthur, attaching to it a roasting plant for the desulphurizing of this Atikokan ore, and it opened a mine where the sulphur content ran from 1 per cent. to about 4 per cent. This furnace ran for a time, but has been idle recently, and it is now to be torn down.

The company proposes, however, to replace this plant by a larger one, that is to be the basis for an investment of several million dollars in steel works and mills at Port Arthur. It is understood that English capital is interested with Mackenzie & Mann in the undertaking. Ore for this steel plant is to be secured from the Atikokan range. Experiments have been under way for some time in the desulphurizing of some Atikokan ores that average not far from 20 per cent. sulphur, and it seems to have been determined that the expense of bringing these pyrrhotites down to a commercial product will not be prohibitory. One wedge type roasting furnace is to be installed at once, as an experiment, though the parties back of the enterprise express no doubt of the practicability of the proposed operation and claim that it has been already worked out. The ore from which it is expected to make iron lies about 125 miles west from Port Arthur, on the main line of the Canadian Northern, and is under lease at a royalty of 25 cents a ton. It is also proposed by these operators to utilize the fumes from their roasting processes for the manufacture of sulphuric acid, although the ores are distinctly pyrrhotite. Iron pyrite ores running from 30 to 40 per cent. sulphur are found in the same general region and exist in considerable quantity.

The iron trade will watch with no little interest experiments in the beneficiation of ores that are usually regarded as somewhat refractory, and furnacemen accustomed to the use of the low-sulphur Lake Superior ores will probably express considerable question as to the outcome. Nevertheless, Mackenzie & Mann claim to have solved the problems involved. Their position is, moreover, somewhat unique in that they can be, for a considerable period, the chief if not the only necessary customers for steel products from any plant of the size they propose to erect at Port Arthur.

## Labor Troubles at Carnegie Steel Plants

Indications now are that the strike among the train crews at the Edgar Thomson works, the Homestead works and the Carrie blast furnaces of the Carnegie Steel Company, which started nearly two weeks ago, will speedily be settled. The trouble originated among the men in the mill transportation crews. The employees of the Union Railroad, operated by the Carnegie Steel Company, were not in any way affected by the strike, nor were they in sympathy with the men that went out.

The disturbance started at the Homestead works over the discharge for cause of three men by the Carnegie Steel Company and its refusal to reinstate them. It then extended to the Edgar Thomson works and blast furnaces and to the Carrie blast furnaces, but neither the Duquesne works nor the Clairton works was in any way affected. On Saturday the strikers were paid off and their number checks were retained by the company, which was notice to them that they were no longer considered as employees. Many of the men soon made application for their old positions and in addition the company brought in strike breakers. At this writing the trouble at the Edgar Thomson works is practically over and the former employees at Homestead are applying in considerable number for their old positions.

The Carnegie Steel Company did not make any concessions whatever to the men, refusing their demand for the reinstatement of the discharged employees and also

their demand that their wages be put on the same basis as those of the employees of the Union Railroad. The Homestead and Edgar Thomson works and some of the Edgar Thomson blast furnaces were compelled to shut down while the trouble was at its height, but all the blast furnaces at Edgar Thomson and the two rail mills are again running. Indications are that by the end of this week the affected departments at the Homestead works will be in full operation.

## Sand Freight Rates Attacked

WASHINGTON, D. C., December 3.—The Puget Sound Iron & Steel Works, Tacoma, Wash.; Columbia Steel Company, Portland, Ore., and San Francisco; Enterprise Foundry Company, San Francisco, and Warman Steel Casting Company, Los Angeles, Cal., have filed complaint with the Interstate Commerce Commission against the Chicago, Rock Island & Pacific Railway Company and about a score of other carriers protesting against the rate on sand from Chicago. The complaint states that "in the manufacture of iron and steel articles, a sand high in percentage of silica is required to assure the castings being smooth, and that the best material for this purpose is found in sand pits located at Ottawa, Minn.; Ottawa, Ill., and adjacent territory." It is alleged that the rate was \$8 per ton on this sand from Chicago to Pacific coast terminals up to January 1, 1909, when it was increased to \$10 per ton and has since been maintained at the latter charge. The complaint further says that "because of the unjust and unduly discriminatory rates petitioners have been compelled to suffer unequal competition with Eastern manufacturers."

W. L. C.

## Youngstown Sheet & Tube Equipment Contracts

The Youngstown Sheet & Tube Company, Youngstown, Ohio, has let contracts for equipment as follows: Southwark Foundry & Machine Company, Philadelphia, one turbo blower for Bessemer steel plant, normal capacity 40,000 cu. ft. air per min. at 27 lb., and maximum 45,000 cu. ft. at 30 lb.; Mesta Machine Company, one 108-in. type B Helander condenser, capacity 90,000 lb. steam per hr., and one 14-in. x 36-in. x 24-in. dry pump; Babcock & Wilcox Company, eight B. & W. superheaters for Rust boilers at blast furnace D; Dravo Contracting Company, Pittsburgh, concrete construction for No. 10 pump house intake; Morgan Engineering Company, Alliance, Ohio, one 10-ton crane, 63 ft. 2 in. span, for the sheet mill warehouse and one 200-ton duplex stripper crane for No. 2 blooming mill; Cleveland Crane & Engineering Company, one 10-ton crane, 45 ft. span, for the sheet mill paint shop; Dravo-Doyle Company, Pittsburgh, two two-stage 12-in. De Laval centrifugal pumps, 5,000,000 gal. capacity, 145 ft. head, and one single stage 24-in. De Laval centrifugal pump, 22,000,000 gal. capacity, 50 ft. head, all three pumps to be motor driven, 250 hp.

The Sanford-Day Iron Works, Inc., Knoxville, Tenn., intends to move its plant gradually from the present site to a 33-acre tract recently purchased. Its business has expanded beyond the capacity of its available space, now found lacking in yard room, in car-building room and blacksmith shop capacity. The company also desires to take on other lines of industrial cars and steel work, such as steel tipples, screens, etc. The first step at removal will probably be to build a blacksmith shop and car shop, but laying out the ground for finally moving the machine shop and foundry, meanwhile transferring the trucks and parts needed from the foundry and machine shop to the new site in carload lots.

The city of Keokuk, Ia., has begun the formulation of plans for an interstate celebration when the hydroelectric plant begins operations there about next June. All the cities in the power zone of the plant will be asked to participate in the celebration.

The Struthers Furnace Company, Struthers, Ohio, blew out its blast furnace November 22 for relining and other repairs of a minor nature. It will be ready to be blown in about January 15.

## New High Rate in Pig Iron

### November Gain of 900 Tons a Day

#### Pittsburgh District Strike Prevents a Considerable Increase

In spite of the strike of Carnegie Steel Company trainmen, which for a time caused the banking of eight furnaces in the Pittsburgh district, our November pig iron statistics show a gain in the daily output rate over the record made in October. The total is somewhat less, however, November being a 30-day month. The coke and anthracite pig iron production last month was 2,630,854 gross tons, or 87,695 tons a day, against 2,689,933 tons, or 86,772 tons a day in October. Apart from the Pittsburgh district there was a net gain of 10 in the number of active furnaces last month, but as 8 Carnegie furnaces that were active November 1 were idle December 1, the net gain is thus 2. The daily active capacity December 1, due to the banked furnaces at the Carrie and Edgar Thomson plants, is about 2000 tons a day less than on November 1, or 86,950 tons against 88,317 tons.

#### Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from November, 1911, is as follows:

#### Daily Rate of Pig Iron Production by Months—Gross Tons.

	Steel works.	Merchant.	Total.
November, 1911	48,430	18,218	66,648
December	46,885	19,027	65,912
January, 1912	47,844	18,540	66,384
February	53,482	18,960	72,442
March	58,961	18,630	77,591
April	61,024	18,157	79,181
May	62,018	19,033	81,051
June	60,799	20,559	81,358
July	58,168	19,570	77,738
August	59,464	21,582	81,046
September	59,102	23,026	82,128
October	62,820	23,952	86,772
November	62,817	24,878	87,695

#### Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces in November and the four months preceding:

#### Monthly Pig Iron Production—Gross Tons.

	July. (31 days)	Aug. (31 days)	Sept. (30 days)	Oct. (31 days)	Nov. (30 days)
New York	167,935	167,337	161,223	179,726	169,677
New Jersey	5,309	5,935	5,693	5,370	6,167
Lehigh Valley	72,248	80,987	79,726	87,182	94,831
Schuylkill Valley	69,776	71,937	71,085	78,440	78,413
Lower Susquehanna and Lebanon Val.	58,032	59,852	65,604	61,480	60,313
Pittsburgh district	583,745	584,601	546,829	621,813	567,868
Shenango Valley	114,877	116,610	121,951	143,115	133,819
Western Penn.	135,876	145,321	142,669	157,027	160,134
Maryland, Virginia and Kentucky	40,313	43,962	42,896	42,286	49,140
Wheeling district	101,674	111,561	108,932	118,034	114,632
Mahoning Valley	234,248	252,342	243,906	256,711	242,952
Central and North Ohio	178,777	196,901	218,867	237,506	236,198
Hocking Valley, Hanging Rock and S. W. Ohio.	31,196	35,410	30,279	38,419	39,231
Chicago district	374,153	383,540	365,115	388,650	398,678
Mich., Minn., Mo., Wis., Col., Wash.	68,910	73,278	77,902	76,774	75,697
Alabama	147,409	156,115	153,374	160,834	167,408
Tenn., Georgia and Texas	26,411	26,742	27,788	36,566	35,696
Total	2,410,889	2,512,431	2,463,839	2,689,933	2,630,854

#### Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

#### Production of Steel Companies—Gross Tons.

	Pig. Total production	Spiegeleisen and ferromanganese.
	1910. 1911. 1912.	1910. 1911. 1912.
January	1,773,201	1,128,448 1,483,153 19,538 8,360 22,622
February	1,620,539	1,185,782 1,550,995 21,396 12,821 15,950
March	1,739,212	1,518,063 1,827,792 25,591 11,784 11,538
April	1,669,898	1,434,142 1,830,717 22,304 10,657 11,104
May	1,619,283	1,310,378 1,922,557 26,529 13,641 20,518
June	1,549,112	1,281,241 1,823,958 27,680 22,611 26,685
July	1,462,689	1,316,646 1,803,205 22,924 17,067 26,522
August	1,442,572	1,460,610 1,843,404 25,756 14,579 24,225
September	1,410,221	1,490,898 1,873,073 15,151 17,757 22,484
October	1,419,624	1,560,884 1,947,426 8,500 19,697 27,252
November	1,242,804	1,452,907 1,884,524 9,032 19,678 17,461
December	1,113,174	1,453,446 12,178 20,698

#### Capacity in Blast December 1 and November 1

The following table shows the daily capacity of furnaces in blast December 1 and November 1 by districts:

#### Coke and Anthracite Furnaces in Blast.

Location of Furnaces.	Total number of stacks.	Dec. 1 number in blast.	Capacity per day.	Nov. 1 number in blast.	Capacity per day.
<b>New York:</b>					
Buffalo	19	17	5,484	16	5,350
Other New York	7	3	608	2	450
New Jersey	7	1	206	1	170
<b>Pennsylvania:</b>					
Lehigh Valley	22	13	2,750	13	2,826
Spiegel	2	2	175	2	170
Schuylkill Valley	16	9	2,614	9	2,530
Lower Susquehanna	7	5	1,188	5	1,165
Lebanon Valley	10	6	734	6	818
Pittsburgh District	49	40	16,750	47	19,934
Spiegel	4	3	364	4	475
Shenango Valley	20	16	4,461	16	4,725
Western Pennsylvania	27	20	5,458	18	5,065
Maryland	4	3	740	2	573
Wheeling District	14	11	4,035	10	3,808
<b>Ohio:</b>					
Mahoning Valley	24	20	8,098	20	7,980
Central and Northern	24	21	7,873	21	8,065
Hocking Val., Hanging Rock & S. W. Ohio	15	9	1,309	9	1,340
Illinois	32	32	13,480	29	12,621
Spiegel	2	1	100	2	204
Mich., Wis. and Minn.	10	8	1,620	7	1,434
Colorado, Mo. and Wash.	8	3	1,078	3	1,042
<b>The South:</b>					
Virginia	23	6	705	6	746
Kentucky	5	3	350	2	265
Alabama	46	22	5,580	21	5,317
Tennessee	20	9	1,190	10	1,222
<b>Total</b>	<b>417</b>	<b>283</b>	<b>86,950</b>	<b>281</b>	<b>88,317</b>

Among furnaces blown in in November were one Niagara and Standish in New York, one Crane in the Lehigh Valley, Earlston in western Pennsylvania, Buena Vista in Virginia, one Maryland Steel Company, one Ashland in Kentucky, one Bellaire in the Wheeling district, one Ohio in the Mahoning Valley, one Federal and one Iroquois in the Chicago district, one Mayville in Wisconsin and Alabama City in Alabama.

The list of furnaces blown out or banked includes one Bethlehem in the Lehigh Valley, three Carrie (banked), four Edgar Thomson (banked) and one Lucy in Allegheny county, one Crozer in Virginia and Struthers in the Mahoning Valley.

#### Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of *The Iron Age*. The figures for daily average production are as follows:

#### Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons.

	1907.	1908.	1909.	1910.	1911.	1912.
January	71,149	33,918	57,975	84,148	56,752	66,384
February	73,038	37,163	60,976	85,616	64,090	72,442
March	71,821	39,619	59,232	84,459	70,036	77,591
April	73,885	38,289	57,962	82,792	68,836	79,181
May	74,048	37,603	60,753	77,102	61,079	81,051
June	74,486	36,444	64,656	75,516	59,585	81,358
July	72,763	39,287	67,793	69,305	57,841	77,738
August	72,594	42,851	72,546	67,963	62,150	81,046
September	72,783	47,300	79,507	68,476	65,903	82,128
October	75,386	50,554	83,856	67,520	67,811	86,772
November	60,937	51,595	84,917	63,659	66,648	87,695
December	39,815	56,158	85,022	57,349	65,912	.....

#### The Record of Production

#### Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons.

	1907.	1908.	1909.	1910.	1911.	1912.
Jan.	2,205,607	1,045,250	1,797,560	2,608,605	1,759,326	2,057,911
Feb.	2,045,068	1,077,740	1,707,340	2,397,254	1,794,509	2,100,815
Mar.	2,226,457	1,228,204	1,832,194	2,617,949	2,171,111	2,405,318
Apr.	2,216,558	1,149,602	1,738,877	2,483,763	2,064,086	2,375,436
May	2,295,505	1,165,688	1,883,330	2,390,180	1,893,456	2,512,582
June	2,234,575	1,092,131	1,930,866	2,265,478	1,787,566	2,440,745
July	2,255,660	1,218,129	2,103,431	2,148,442	1,793,068	2,410,889
Aug.	2,250,410	1,359,831	2,248,930	2,106,847	1,926,637	2,512,431
Sept.	2,183,487	1,418,998	2,385,206	2,056,275	1,977,102	2,463,839
Oct.	2,336,972	1,567,198	2,599,541	2,093,121	2,102,147	2,689,933
Nov.	1,828,125	1,577,854	2,547,508	1,909,780	1,999,433	2,630,854
Dec.	1,234,279	1,740,912	2,635,680	1,777,817	2,043,270	.....

The Conneaut Shovel Company, Conneaut, Ohio, which is erecting a new shovel plant, has finished the foundations. The main building is to be 246 x 500 ft. of saw-tooth construction and will be equipped with individual motor-driven machinery. The company will be in the market for a complete line of machinery for making strap back shovels and a generating unit of 150 to 200 hp.



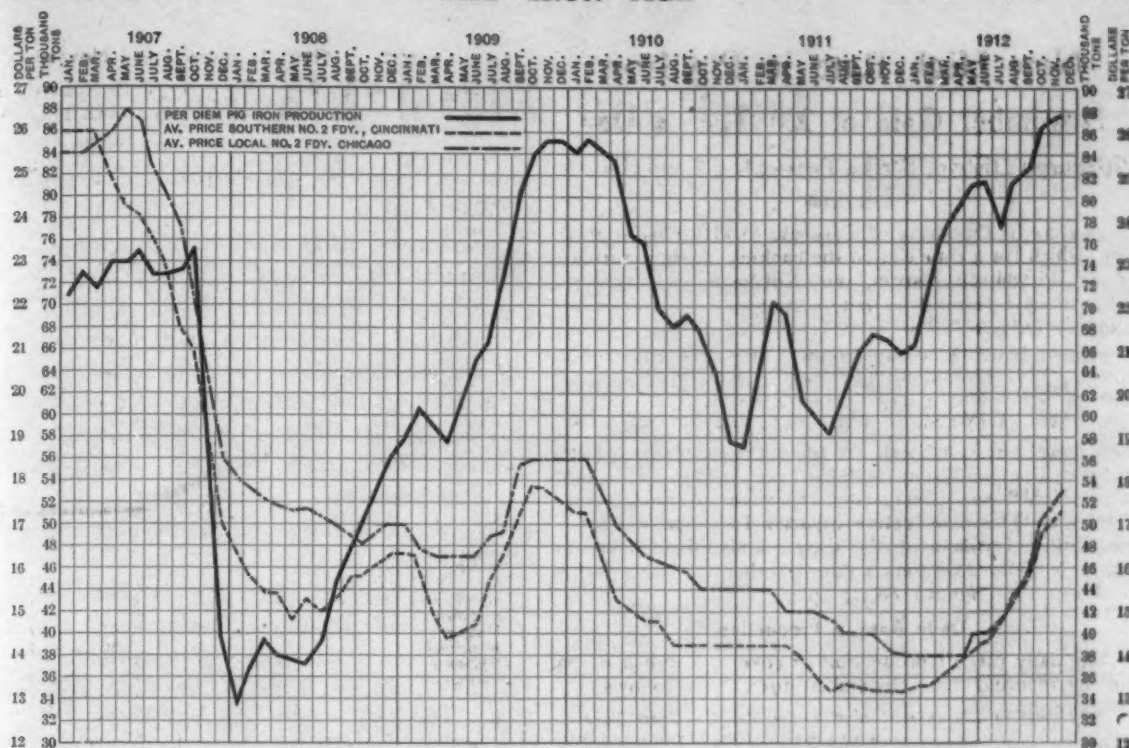


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to December 1, 1912; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

### Test of a Steam Boiler Equipped with Steam Air Jets

The use of steam air jets in connection with steam boilers was mentioned in a paper by A. G. Hall, chief smoke inspector of Cincinnati, read before the Cincinnati Railway Club, November 12. He conducted a test of a horizontal return tubular plant equipped with steam air jets. A pyrometer was placed in the combustion chamber and 1-min. readings were taken. Nine shovelfuls of coal were fired at intervals of about 14 min. In each case the temperature rose 100 to 150 deg. F. higher with the jets on than with them off. Also the draft over the fire increased 0.03 in. with the jets on. With the jets on there was no smoke, and with the jets off the stack emitted dense smoke for a period of 5.5 min. after each fresh charge of coal was put on the fire. Analysis of flue gases was made with the following results. With jets on an average of 11.4 per cent. carbon dioxide, 7 per cent oxygen and 0.4 per cent. carbon monoxide was obtained, whereas 4.8 per cent. carbon monoxide, 14.3 per cent. oxygen and 1.3 per cent. carbon monoxide was shown with the jets off.

### Cleveland Foundrymen Given the Story of Iron

About 75 Cleveland manufacturers, chiefly foundrymen, were guests of Rogers, Brown & Co. at luncheon at the Cleveland Chamber of Commerce, Tuesday noon, December 3. Following the luncheon the Rogers, Brown & Co. moving pictures illustrating the story of iron and steel "From Mine to Molder" were shown and explained by H. B. B. Yergason of the Cincinnati office of the company, under whose directions the pictures were taken. The processes illustrated included mining, transporting to the docks, loading on the boats, unloading, converting into pig iron and finished steel.

A charter has been issued to the Hopewell Company, Reading Pa., under Pennsylvania laws, with a capital stock of \$20,000, for mining purposes. A. M. Mumma, M. M. Gledhill and J. H. Gledhill are the incorporators. The company proposes to operate the old Warwick iron ore mines near Reading.

Claire furnace, of M. A. Hanna & Co., at Sharpsville, Pa., which has been idle for several years, is expected to resume about January 1.

### Watson-Stillman Company Improvements

The Watson-Stillman Company will move its main office December 15 from 50 Church street, New York, to Aldene, N. J., where its plant is located. At 50 Church street the company will retain a sales office in room 1560. For its executive and office purposes the company is erecting an administration building at Aldene and is also about to build an extension of 100 x 120 ft. to its machine shop, to be used as an erecting department. Most of the equipment required in the new addition, which will be completed about July 1, has been contracted for. The business of the Watson-Stillman Company has been very good and has included some excellent orders for export.

The Lebanon Chain Works Company, Lebanon, Pa., according to a press dispatch, has been reorganized with a capital of \$300,000, and the plant, which has been idle for several years, will resume operations at an early date. The following officers are named: President, Thomas Evans; vice-president and general manager, Eli Attwood; secretary-treasurer, H. T. Atkins, all of Lebanon, Pa. Others identified with the new corporation are E. U. Sowers, H. G. Lauser and G. H. Moyer of Lebanon, and Charles Wilhelm, Albert Broden and Herman Hecht of Reading.

C. C. Kavanaugh, W. M. Kavanaugh, D. H. Cantrell and others of Little Rock, Ark., interested in the Little Rock Railroad & Electric Company, have acquired control of the Garland Power & Development Company, owning water power on the Ouachita River. It is intended to construct a hydroelectric plant of about 28,000 hp. and equip a transmission system which is to serve the central and southwestern portion of Arkansas.

The Youngstown Seamless Tube & Iron Company, Youngstown, Ohio, has been organized with a capital stock of \$40,000 for the purpose of manufacturing seamless tubing by a process devised by Frank E. Simpkins, one of the incorporators.

It is quite confidently asserted that the railroads will ask the Interstate Commerce Commission for permission to increase freight rates to meet the \$2,000,000 increase in wages of engineers awarded by the board of arbitrators.

# The Iron and Metal Markets

## Curtailment Due to Strike

### Pittsburgh Output Now Nearly Normal Pig Iron Production Grows—Unusual Eastern Sale of Lake Ores

Some subsidence of activity in pig iron and to a less extent in steel is noticed and is treated as a natural development, in view of the long period ahead for which buyers are covered and producers are sold. The search for signs of an early change to a less favorable condition does not reveal any.

The possibilities of a shortage of certain forms of steel as a result of the strike of trainmen at the Edgar Thomson and Homestead Works of the Carnegie Steel Company have been recognized by the entire trade. There has been some curtailment, not large, of pig iron production and the company's steel production has been cut down somewhat, but there has been a resumption of operations at nearly all the blast furnaces affected, and today steel output is nearly normal. Many of the strikers have returned to work and full resumption is expected by the end of the week.

But for the strike, the country's pig iron production in November, a 30-day month, would have exceeded the great record made in the 31 days of October. As it was, the daily rate in November was nearly 900 tons more than in October, the output last month being 2,630,854 gross tons, or 87,695 tons a day, against 2,689,933 tons in October, or 86,772 tons a day. There was a gain of 10 in active furnaces last month, apart from the Pittsburgh district, but 7 Carnegie furnaces were banked as December came in and one was blown out November 30. Thus the net gain was two furnaces. Active capacity December 1 was 86,950 tons, against 88,317 tons one month previous, but the resumptions this week in the Pittsburgh district have now brought the rate up above that for November 1.

Merchant pig iron stocks were reduced in November, though not heavily. The Carnegie Steel Company drew on its stocks to such an extent that they are now smaller than ever.

A further shrinkage in pig iron buying has made all markets quieter than in a good many weeks. The only apparent weakness, however, is in some Southern resale iron, prompt sales of which have been made as low as \$13.50, Birmingham. These have affected the situation to the extent that iron for 1913 delivery that has been held at \$14.50 can be had more freely at \$14. On the Pacific Coast a shipment of pig iron from India is commented on, as was the first one from China a few years ago.

Our English cable says that Welsh buyers of American sheet bars have notice that deliveries promised for December cannot be completed until May. The disappointed buyers have turned to Germany in vain, and it is also reported that American buyers have tried to get German semi-finished steel. These, like similar attempts from this country to get structural steel and plates abroad, have had no result. European works are overflowing with orders, and many of their prices are

up to or beyond the American parity, saying nothing of freight and duty.

There is no relief from the tightness in the steel billet and sheet bar situation at Pittsburgh or in the East. Forging billets are still sold at \$35 at Central Western mill. The contract sheet bar price for the first quarter of 1913 may be announced this week.

In all forms of finished material the pressure for deliveries keeps up, and in the Chicago district car and structural works and boiler shops, as well as jobbers, are more clamorous. Some building projects are delayed by inability to get steel, but the present price level is evidently not an obstacle.

New car orders include 2000 for the Pittsburgh & Lake Erie and 1500 for the Burlington. Late inquiries reported from Chicago are 3000 for the Minneapolis & St. Louis and 1400 for the Denver, Northwestern & Pacific.

The wire trade is in excellent condition, but there is less expectation now of an advance in prices. That feeling, in fact, extends to the whole line of finished products.

Cast iron pipe business, which was quiet following the election, has picked up noticeably of late, a good volume of inquiries coming from gas and water companies.

Coke producers have held their position and late contracts for 1913 have been at \$3 for furnace coke for all the year, while for the first half buyers have had to pay \$3.25. A 360,000-ton contract for all of 1913 was put through at close to \$3.

The season's shipments of Lake Superior iron ore by lake are close to 47,430,000 tons, and all-rail shipments will probably bring the total above 48,000,000 tons. Buying for 1913 has been quite active at Cleveland, and ore sellers have argued with sellers disposed to hold off that labor supply may not permit of a 50,000,000-ton year. Eastern sales of Lake ore continue and a 2,000,000-ton total east of the Alleghenies is now expected, or more than in many years.

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type,  
Prices in Italics.

At date, one week, one month and one year previous.				
	Dec. 4, 1912.	Nov. 27, 1912.	Nov. 6, 1912.	Dec. 6, 1911.
<b>Pig Iron, Per Gross Ton:</b>				
Foundry No. 2 N, Philadelphia.	\$18.50	\$18.50	\$18.25	\$14.85
Foundry No. 2, Valley furnace.	17.00	17.00	16.75	13.00
Foundry No. 2, S'th'n, Cin'ti.	17.25	17.25	17.25	13.00
Foundry No. 2, Birmingham, Ala.	14.00	14.00	14.00	9.75
Foundry No. 2, furnace, Chicago*	18.00	18.00	17.50	14.00
Basic, delivered, eastern Pa.	18.25	18.25	18.00	14.50
Basic, Valley furnace	16.50	16.50	16.25	12.25
Bessemer, Pittsburgh	18.15	18.15	17.90	14.90
Malleable Bessemer, Chicago	18.00	18.00	17.50	14.35
Gray forge, Pittsburgh	17.15	17.15	16.40	13.40
Lake Superior charcoal, Chicago	18.75	18.75	18.25	16.50
<b>Billets, etc., Per Gross Ton:</b>				
Bessemer billets, Pittsburgh	27.00	27.00	27.00	19.00
Open hearth billets, Pittsburgh	27.50	27.50	27.50	19.00
Forging billets, Pittsburgh	34.00	34.00	34.00	24.00
Open hearth billets, Philadelphia	32.00	32.00	30.00	21.40
Wire rods, Pittsburgh	30.00	30.00	29.00	25.00
<b>Old Material, Per Gross Ton:</b>				
Iron rails, Chicago	18.00	18.00	18.00	14.50
Iron rails, Philadelphia	18.50	19.00	18.00	15.50
Car wheels, Chicago	17.00	17.00	16.50	12.75
Car wheels, Philadelphia	15.00	15.00	15.00	12.00
Heavy steel scrap, Pittsburgh	14.75	14.75	15.50	12.25
Heavy steel scrap, Chicago	13.00	13.00	13.75	9.75
Heavy steel scrap, Philadelphia	15.00	15.50	15.50	12.00

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.



## Finished Iron and Steel,

	Dec. 4, 1912.	Nov. 27, 1912.	Nov. 6, 1912.	Dec. 6, 1911.
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill.	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.67½	1.67½	1.67½	1.22½
Iron bars, Pittsburgh.....	1.65	1.65	1.55	1.20
Iron bars, Chicago.....	1.55	1.55	1.50	1.15
Steel bars, Pittsburgh, future...	1.40	1.40	1.40	1.10
Steel bars, Pittsburgh, prompt...	1.60	1.60	1.60	1.10
Steel bars, New York, future...	1.56	1.56	1.56	1.26
Steel bars, New York, prompt...	1.76	1.76	1.76	1.26
Tank plates, Pittsburgh, future...	1.45	1.45	1.45	1.15
Tank plates, Pittsburgh, prompt...	1.70	1.70	1.60	1.15
Tank plates, New York, future...	1.61	1.61	1.61	1.31
Tank plates, New York, prompt...	1.86	1.86	1.76	1.31
Beams, Pittsburgh, future.....	1.45	1.45	1.45	1.15
Beams, Pittsburgh, prompt.....	1.75	1.75	1.55	1.15
Beams, New York, future.....	1.61	1.61	1.61	1.31
Beams, New York, prompt.....	1.91	1.91	1.71	1.31
Angles, Pittsburgh, future.....	1.45	1.45	1.45	1.15
Angles, Pittsburgh, prompt.....	1.75	1.75	1.61	1.15
Angles, New York, future.....	1.61	1.61	1.61	1.31
Angles, New York, prompt.....	1.91	1.91	1.71	1.31
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.40	1.12½
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.45	1.20
Steel hoops, Pittsburgh.....	1.50	1.50	1.50	1.30

## Sheets, Nails and Wire,

	Cents.	Cents.	Cents.	Cents.
Per Pound to Large Buyers:				
Sheets, black, No. 28, Pittsburgh	2.25	2.25	2.25	1.85
Wire nails, Pittsburgh.....	1.70	1.70	1.70	1.50
Cut nails, f.o.b. Eastern mills..	1.75	1.75	1.75	...
Cut nails, Pittsburgh.....	1.70	1.70	1.70	1.45
Fence wire, ann'l'd, 0 to 9, P'gh.	1.50	1.50	1.50	1.30
Barb wire, galv., Pittsburgh....	2.10	2.10	2.10	1.85

## Coke, Connellsville,

	Per Net Ton.	at Oven:		
Furnace coke, prompt shipment	\$4.00	\$3.90	\$4.00	\$1.50
Furnace coke, future delivery...	3.25	3.25	3.00	1.60
Foundry coke, prompt shipment..	4.25	4.25	4.25	1.90
Foundry coke, future delivery...	3.75	3.75	3.75	2.10

## Metals,

	Cents.	Cents.	Cents.	Cents.
Per Pound to Large Buyers:				
Lake copper, New York.....	17.75	17.75	17.50	13.37½
Electrolytic copper, New York..	17.50	17.62½	17.25	13.12½
Spelter, St. Louis.....	7.25	7.35	7.35	6.55
Spelter, New York.....	7.40	7.50	7.30	6.70
Lead, St. Louis.....	4.20	4.35	4.60	4.37½
Lead, New York.....	4.35	4.50	4.75	4.45
Tin, New York.....	49.30	49.55	50.15	45.50
Antimony, Hallett, New York...	9.50	9.75	9.75	7.65
Tin plate, 100-lb. box, Pittsburgh	\$3.60	\$3.60	\$3.60	\$3.40

## Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.; New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

**Plates.**—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.70c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.25
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.40
Marine steel.....	.40
Locomotive fire box steel.....	.40
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inc.	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inc.	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

**Structural Material.**—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in.

and over, and zees, 3 in. and over, 1.45c. to 1.70c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.....	1.50 to 1.55
H-beams over 18 in.....	1.50 to 1.55
Angles over 6 in.....	1.30 to 1.55
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card, Sept. 1, 1909.....	1.50 to 1.55
Tees, 3 in. and up.....	1.30 to 1.55
Angles, channels and tees, under 3 in. plus full extras as per steel bar card, Sept. 1, 1909.....	1.50 to 1.55
Deck beams and bulb angles.....	1.75 to 1.80
Hand rail tees.....	2.20 to 2.30
Checkered, trough and corrugated floor plates...	2.35 to 2.55

## Extras for Cutting to Length.

	Cents per lb.
Under 3 ft., to 2 ft. inclusive.....	.25
Under 2 ft., to 1 ft. inclusive.....	.50
Under 1 ft.....	1.55
No charge for cutting to lengths 3 ft. and over.	

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (card weight) in effect from September 10, 1912, one point greater being allowed on merchant weight; iron pipe (full weight), from October 21, 1912:

## Butt Weld.

Steel.	Black.	Galv.	Iron.	Black.	Galv.
Inches.			Inches.		
¾, 1 and ¾.....	72	52	¾ and ¾.....	67	48
1½.....	76	66	1.....	66	47
2 to 3.....	79	71	1½.....	70	57
			2 to 2½.....	73	62

## Lap Weld.

2.....	76	68	1½.....	57	46
2½ to 6.....	78	70	1¾.....	68	57
7 to 12.....	76	66	2.....	69	59
13 to 15.....	53	..	2½ to 4.....	71	62
			4½ to 6.....	71	62
			7 to 12.....	69	56

## Plugged and Reamed.

1 to 3, butt.....	77	69	1 to 1½, butt.....	71	60
2, lap.....	74	66	2, butt.....	72	61
2½ to 4, lap.....	76	68	1½, lap.....	55	44
			1¾, lap.....	66	55
			2, lap.....	67	57
			2½ to 4, lap.....	69	60

## Butt Weld, extra strong, plain ends.

¾, 1 and ¾.....	68	58	¾.....	64	53
1½.....	73	67	1.....	68	61
2 to 1½.....	77	71	¾ to 1½.....	72	63
2 to 3.....	78	72	2 and 2½.....	73	64

## Lap Weld, extra strong, plain ends.

2.....	74	66	1½.....	66	60
2½ to 4.....	76	68	2.....	67	59
4½ to 6.....	75	67	2½ to 4.....	71	62
7 to 8.....	68	58	4½ to 6.....	70	61
9 to 12.....	63	53	7 and 8.....	64	54
			9 to 12.....	59	48

## Butt Weld, double extra strong, plain ends.

¾.....	63	57	¾.....	58	50
¾ to 1½.....	66	60	¾ to 1½.....	61	53
2 to 2½.....	68	62	2 to 2½.....	63	55

## Lap Weld, double extra strong, plain ends.

2.....	64	58	2.....	56	50
2½ to 4.....	66	60	2½ to 4.....	61	55
4½ to 6.....	65	59	4½ to 6.....	60	54
7 to 8.....	58	48	7 to 8.....	53	43

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

**Wire Rods and Wire.**—Bessemer, open hearth and chain rods, \$30. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.50; galvanized, \$1.90. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.70. Wire nails to jobbers, \$1.70.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

## Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed ..	\$1.65	\$1.70	\$1.75	\$1.80	\$1.90	\$2.00	\$2.10	\$2.20
Galvanized ..	2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90

**Boiler Tubes.**—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.	Standard Charcoal Iron.
1½ to 2½ in.....	62
2½ in.....	64½
2½ to 3½ in.....	69½
3½ to 4 in.....	72
5 and 6 in.....	64½
7 to 13.....	62
1½ in.....	46
1½ to 2½ in.....	48
2½ in.....	53
2½ to 3½ in.....	55½
3½ to 5 in.....	58
Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.  
2½ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

**Sheets.**—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

*Blue Annealed Sheets.*

	Cents per lb.
Nos. 3 to 8.....	1.60 to 1.70
Nos. 9 and 10.....	1.65 to 1.75
Nos. 11 and 12.....	1.70 to 1.80
Nos. 13 and 14.....	1.75 to 1.85
Nos. 15 and 16.....	1.80 to 1.90

*Box Annealed Sheets, Cold Rolled.*

Nos. 10 and 11.....	1.90 to 2.00
No. 12.....	1.90 to 2.00
Nos. 13 and 14.....	1.95 to 2.05
Nos. 15 and 16.....	2.00 to 2.10
Nos. 17 to 21.....	2.05 to 2.15
Nos. 22 and 24.....	2.10 to 2.20
Nos. 25 and 26.....	2.15 to 2.25
No. 27.....	2.20 to 2.30
No. 28.....	2.25 to 2.35
No. 29.....	2.30 to 2.40
No. 30.....	2.40 to 2.50

*Galvanized Sheets of Black Sheet Gauge.*

Nos. 10 and 11.....	2.40 to 2.50
No. 12.....	2.50 to 2.60
Nos. 13 and 14.....	2.50 to 2.60
Nos. 15 and 16.....	2.65 to 2.75
Nos. 17 to 21.....	2.80 to 2.90
Nos. 22 and 24.....	2.95 to 3.05
Nos. 25 and 26.....	3.10 to 3.20
No. 27.....	3.25 to 3.35
No. 28.....	3.40 to 3.50
No. 29.....	3.55 to 3.65
No. 30.....	3.70 to 3.80

## Pittsburgh

PITTSBURGH, PA., December 4, 1912.

Quieter conditions prevail in the steel trade. The amount of contracting that was done with the mills in November was considerably smaller than in October, but this was naturally expected as the legitimate result of the very heavy buying for three or four months. Jobbers and consumers are now pretty well covered for some time ahead. The pressure on the mills for deliveries is stated to be just as strong as ever. Most of the material called for in the contracts placed is for first quarter, but a considerable part of it is for second quarter. The Carnegie Steel Company states that on specific work it cannot take any new orders before third quarter, while several of the other leading steel companies have little to spare for second quarter and practically none for first. It is probable that some records for production would have been broken in November by the Carnegie Steel Company, but the strike of the mill train crews, now about settled, seriously interfered with operations at several of its largest plants. Prices are strong all along the line, and even the scrap trade, which has been sagging for some weeks, is showing signs of recovery.

**Pig Iron.**—While the market is firm it has been very quiet the past week. Most of the large consumers of steel making pig iron that have been buying in the open market have covered their wants through first quarter at least, about the only one that will need iron for first quarter being the Pittsburgh Steel Company, which uses 18,000 to 20,000 tons a month and has not yet covered. Consumers are taking iron out promptly and are prodding furnace men to ship faster. Several furnaces have run short of coke recently and have been compelled to shut down 24 to 48 hours, waiting for fuel. The new sales of pig iron in the past week were mostly of malleable Bessemer and foundry. We note sales of 2500 to 3000 tons of malleable Bessemer at about \$17.25 at Valley furnace, and 4000 tons of No. 2 foundry for first quarter at about the same price. There have been no important sales of Bessemer or basic, but prices are strong with predictions that both will be higher before the first of the year. We quote standard Bessemer iron at \$17.25 for remainder of this year and first quarter; basic, \$16.50 for same deliveries; No. 2 foundry, \$17 for prompt and \$17 to \$17.25 for first quarter; gray forge, \$16.25 to \$16.50; malleable Bessemer, \$17 to \$17.25, all at Valley furnace, the freight rate for delivery in the Pittsburgh district being 90c. a ton.

**Billets and Sheet Bars.**—The amount of steel selling in the open market is so small that it is somewhat difficult to quote accurate prices, as most of the sales are being made by dealers and only in small lots. A local consumer bought last week about 600 tons of 4 x 4 in. Bessemer billets at a price slightly under \$27, Pitts-

burgh. A sale of 300 tons of open hearth sheet bars is reported at a price close to \$28.50, Pittsburgh. Forging billets are very scarce and are said to have sold as high as \$35 at maker's mill for prompt shipment. We give nominal quotations on steel as follows: Bessemer billets, \$27; Bessemer sheet bars, \$27.50; open hearth billets, \$27.50, and open hearth sheet bars, \$28, f.o.b. mill, Pittsburgh or Youngstown. Forging billets are \$34 or higher and axle billets are about \$32 to \$33, Pittsburgh.

**Ferroalloys.**—Consumers of ferromanganese are still having a good deal of trouble getting deliveries as fast as needed and have to come in the market quite frequently for a carload or two to help out until delayed shipments arrive. Inquiry for ferromanganese for next year is quiet, as nearly all consumers are covered for first half and some through the entire year. We quote 80 per cent. English ferromanganese for first half at \$63.50 to \$65, Baltimore, and for second half, \$61. Carload lots of prompt ferromanganese bring \$74 to \$75, Baltimore. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$75; over 100 tons to 600 tons, \$74; over 600 tons, \$73, Pittsburgh. We quote 10 per cent. at \$24; 11 per cent., \$25; 12 per cent., \$26, f.o.b. cars at furnace, Jackson, Ohio, or Ashland, Ky. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over and 12½c. in lots up to 2000 lb.

**Steel Rails.**—Of the Pennsylvania Railroad order for over 80,000 tons of rails the Carnegie Steel Company expects to roll 20,000 to 25,000 tons. The new rail mills of this interest at Bessemer, which were down temporarily on account of labor troubles, are again in practically full operation. The Ohio works at Youngstown is off rails and is rolling billets and sheet bars. The new demand for light rails continues quite active, the Carnegie Company having received new orders and specifications in the past week for about 2200 tons. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c.; 16 and 20-lb., 1.30c.; 12 and 14-lb., 1.35c., and 8 and 10-lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

**Wire Rods.**—The new demand is fairly active, but the available supply of rods is still light, two leading makers reporting themselves out of the market as sellers. We note two sales of Bessemer and open hearth rods aggregating close to 1200 tons on the basis of \$30, Pittsburgh.

**Muck Bar.**—There is not much new inquiry and on the other hand the available supply is light, most makers keeping their entire output for their own needs. We quote best grades, made from all pig iron, at \$32.50, Pittsburgh.

**Skelp.**—A sale is reported to a local pipe mill of about 2000 tons of wide sheared iron plates on the basis of about 1.87½c., Pittsburgh. The new demand for skelp has been active for some time, the mills being well sold up and somewhat behind in deliveries. We quote grooved skelp at 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.75c. to 1.80c.; sheared iron skelp, 1.85c. to 1.87½c., delivered at buyers' mills in the Pittsburgh district.

**Plates.**—While new car orders have been light, several heavy inquiries are either in the market or will be shortly. The Pittsburgh & Lake Erie has bought 1000 cars from the Pressed Steel Car Company and 1000 from the Standard Steel Car Company, making 4000 cars it has ordered recently. The Chicago, Burlington & Quincy has bought 1500 steel underframe freight cars. Inquiries include 3000 steel hopper cars for the Duluth & Iron Range and Duluth, Missabe & Northern railroads owned by the Steel Corporation; a reported inquiry of the New York Central for 10,000 to 15,000 cars; one from the Minneapolis & St. Louis for 3000 cars and one from the Chesapeake & Ohio for 2500. Announcement is made that the Santa Fé Railroad has decided to spend \$8,000,000 for new equipment. The city of Baltimore is in the market for 800 tons of plates for an extension to its water works lines. All the plate mills are from six to eight weeks back in delivery and the Carnegie Steel Company will not accept new orders for plates for delivery before third quarter. Plate mills that are not sold so far ahead and can make deliveries within two to three weeks are still able to obtain from 1.65c. to 1.80c., Pittsburgh. We continue to quote ¼ in. and heavier tank plates at 1.45c. to 1.50c., Pittsburgh, for delivery at convenience of the mill, which means not before second quarter of next year.

**Structural Material.**—Contracts placed in the past week have been light and new inquiry has quieted down. The American Bridge Company has taken some bridge work for a Western railroad involving 3200 tons and



also a steel building in the West requiring about 3000 tons. The McClintic-Marshall Construction Company has taken 325 tons of bridge work for a Southern road. Revised plans are now being made for the Elizabeth-Steel Magee Hospital in this city, requiring about 900 tons. The two leading makers are still quoting beams and channels up to 15 in. at 1.45c. to 1.50c. for delivery at their convenience, which with one means not before second quarter and with the other the third quarter of next year. Small lots of beams and channels for prompt shipment are selling from 1.85c. up to 2.25c., buyers paying these premiums rather than hold up jobs for which a few beams are needed.

**Car Wheels.**—The Carnegie Steel Company has sold 4000 car wheels for freight service to the Norfolk & Western Railroad. We quote 33 in. wheels for freight service at \$15 to \$15.50 and 36 in. wheels for passenger cars at \$19 to \$19.50 per wheel, f.o.b. Pittsburgh.

**Iron and Steel Bars.**—The new demand for both iron and steel bars is not so heavy, as jobbers and consumers have covered their wants for a considerable time ahead. It is stated that the tonnage represented in the heavy contracts for steel bars placed with the mills for delivery in first and second quarters of next year is very much larger than generally believed, and one leading maker is reported to have its product sold for the first nine months of next year. The steel car companies and implement makers are specifying freely against their contracts. The makers of iron bars report a fair amount of new business and state that specifications against contracts continue very heavy. All the makers of steel bars are back in deliveries from 8 to 12 weeks and several makers of iron bars report that they have nothing to spare before second quarter. We quote merchant steel bars at 1.40c. to 1.45c. for such delivery, while for shipment this year from 1.50c. to 1.75c. is readily paid by consumers. Prices on iron bars are 1.65c. to 1.70c. at mill for reasonably prompt shipment. Mills continue to charge \$1 extra per ton for twisting 3/4-in. and larger steel bars and \$2 extra for 1/2 to 3/4 in.

**Sheets.**—Makers report that while the new demand continues fairly heavy it is slowing down to some extent, as jobbers and consumers have pretty well covered their wants through first quarter and in some cases into second quarter. The general policy of the mills has been to accept contracts from jobbers for first quarter only, while contracts from manufacturers of roofing products were accepted for delivery in first half of 1913 and in some special cases into third quarter. Owing to the heavy specifications that have been coming in for some time, most of the sheet mills are back in deliveries from 8 to 10 weeks, and granting that full output will be made in December, they will enter the new year with very close to two months' work ahead. It is stated that the American Sheet & Tin Plate Company has specifications on its books on black sheets for about eight weeks' work and on galvanized for about 12 weeks, so that its output for first quarter is pretty well under contract and it has a good deal of tonnage sold for second quarter and a fair amount for the third quarter. This company might be able to spare a small tonnage of sheets for first quarter. It is booking its contracts on the basis of 2.25c. for No. 28 black and 3.40c. for No. 28 galvanized. Some of the leading independent mills are sold ahead to about the same extent, so that operations of the sheet mills in first quarter at least promise to be at full rate capacity. Some of the independent sheet mills that can make deliveries in three or four weeks are understood to be naming 2.35c. on No. 28 black and 3.50c. on No. 28 galvanized, and are selling a fair tonnage at these prices. As yet no announcement has been made by the steel mills as to the price of sheet bars for first quarter, but this will soon be done.

**Tin Plate.**—No trouble has been experienced by the tin plate mills in selling their output as far ahead in 1913 as they care to, and in some cases heavy contracts from meat packers and can makers have been accepted for delivery all through the year. Some of the mills refuse to sell to jobbers for delivery further ahead than first quarter, but with manufacturing consumers the usual policy has been followed of entering their contracts for practically a year ahead. The enormous business thus booked has been done at practically the full price of \$3.60 per base box, the usual slight differential being allowed to very heavy consumers. There is a feeling among a good many of the mills that, in view of the high prices of spelter and pig tin tin plate ought to be higher, say about \$3.70 per base box. It is difficult to figure out, however, how an advance in the price would be of much benefit to the mills, as they have already sold the bulk of their output for 1913. If, however, the price should be put at \$3.70 or \$3.75 it would probably cause consumers that have

contracts at the low price to specify more freely. All the mills are running to practically full capacity with the outlook for operations in the winter months very good. Several of the tin plate mills have made a readjustment in prices of 8-lb. roofing plates, resulting in an advance of 10c. per box, and we now quote these at \$3.45 instead of \$3.35, the former price. The market is firm at \$3.60 per base box for 14 x 20 coke plates, in carload and larger lots.

**Spelter.**—The market has been stronger and buying has been a little freer. We quote prime grades at 7.25c. to 7.30c., East St. Louis, equal to 7.37 1/2c. and 7.42 1/2c., Pittsburgh.

**Railroad Spikes.**—The new demand continues active. A leading Western road is reported to have placed 20,000 to 25,000 kegs with a local maker for delivery over first half of next year. All the spike makers are back in deliveries from six to eight weeks or longer and small railroad and boat spikes can hardly be had at any price, bringing \$2 to \$3 premiums for reasonably prompt deliveries.

**Hoops and Bands.**—New buying is light, as nearly all consumers are covered for some time ahead. These are specifying very freely against contracts. We quote steel bands at 1.40c. to 1.45c., with extras as per the steel bar card, and hoops at 1.50c., Pittsburgh, for shipment through first half of next year. For prompt delivery it is probable that premiums would be paid.

**Bolts and Rivets.**—One leading maker states that on rivets it is not taking new orders for delivery before second quarter, while on nuts and bolts it is sold up for six months. The new demand continues heavy and consumers are specifying very freely against their contracts. We quote button head structural rivets at \$2.10 and cone head boiler rivets at \$2.20 per 100 lb. for forward delivery, but for spot shipment a premium of \$2 a ton over these prices is obtained. The new discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws.....	.80 and 10% off
Small carriage bolts, cut threads.....	.75 and 7 1/2% off
Small carriage bolts, rolled threads.....	.75, 10 and 2 1/2% off
Large carriage bolts.....	.70 and 3% off
Small machine bolts, rolled threads.....	.75, 10 and 7 1/2% off
Small machine bolts, cut threads.....	.75, 10 and 2 1/2% off
Large machine bolts.....	.70 and 10% off
Machine bolts with C.P.C. and T nuts, small.....	.75 and 7 1/2% off
Machine bolts with C.P.C. and T nuts, large.....	.70 and 2 1/2% off
Square hot pressed nuts, blanked and tapped.....	\$5.80 off list
Hexagon nuts.....	\$6.40 off list
C.P.C. and R. square nuts, tapped and blank.....	\$5.80 off list
Hexagon nuts 3/4 and larger.....	\$6.70 off list
Hexagon nuts smaller than 3/4.....	\$7.30 off list
C.P. plain square nuts.....	\$5.30 off list
C.P. plain hexagon nuts.....	\$5.60 off list
Semi-finished hexagon nuts 3/4 and larger.....	.85 and 5% off
Semi-finished hex. nuts smaller than 3/4.....	.85, 10 and 5% off
Rivets, 7/16 x 6 1/2, smaller and shorter.....	.75, 10 and 10% off
Rivets, metallic tinned, bulk.....	3 1/2c. per lb. net extra
Rivets, tin plated, bulk.....	1 1/2c. per lb. net extra
Rivets, metallic tinned, packages.....	.70, 10 and 10% off

**Wire Products.**—No announcement has come from the leading interest of the expected advance of \$1 to \$2 a ton and the impression is growing that it will not take place. The new demand for wire and wire nails is fairly heavy and jobbers are specifying very freely against contracts. It is stated that the output of wire products by the American Steel & Wire Company in November was the heaviest in any one month in its history. We quote wire nails at \$1.70 to \$1.75 per keg; cut nails, \$1.70 per keg; galvanized barb wire, \$2.10 per 100 lb.; painted, \$1.70; annealed fence wire, \$1.50, and galvanized fence wire, \$1.90, f.o.b. Pittsburgh, usual terms, freight added to point of shipment. Jobbers charge the usual advances for small lots from store.

**Merchant Steel.**—New orders are fairly active, and all the mills have contracts that if specified for will take their output through the first quarter. One leading maker reports that its shipments in November were the heaviest in any one month this year and that it is still back in deliveries from 8 to 10 weeks. Prices are firm. We quote: Iron finished tire, 1 1/2 x 3/4 in. and larger, 1.40c. to 1.55c., base; under 1 1/2 x 3/4 in., 1.55c. to 1.65c.; planished tire, 1.60c. to 1.70c.; channel tire, 3/4, 3/8 and 1 in., 1.90c. to 2c.; 1 1/2 in. and larger, 1.80c. to 1.90c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.50c. to 1.65c.; concave and convex, 1.80c. to 1.90c.; cutter shoes, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c. to 1.85c.

**Shafting.**—The demand has quieted down somewhat, as jobbers and consumers have covered their wants for a considerable time ahead. Specifications from the implement makers and automobile builders are coming in very freely, and several leading makers state they are pretty well sold up into second quarter. Prices are firm. We quote cold rolled shafting at 60 per cent. off

in carload and larger lots and 55 per cent. in small lots delivered in base territory.

**Merchant Pipe.**—The announcement made by the National Tube Company last week of its intention to change pipe weights and lists generally on January 1 has created a great deal of interest in the pipe trade. Several of the leading makers state that they are heartily in favor of this move and believe that it will be of considerable benefit to the trade. Two makers of pipe are understood to be preparing new lists to conform to those of the National Tube Company and to become effective January 1. The new demand for merchant pipe is quieting down, as jobbers are carrying pretty heavy stocks from which they are able to supply their trade at a fairly prompt rate. Reports are that a California natural gas interest is inquiring for about 100 miles of 16-in. line pipe to replace a 10-in. line which it found was not large enough. It is stated that discounts on both iron and steel pipe printed on a previous page are being firmly held.

**Boiler Tubes.**—New buying for the time being is pretty well over as jobbers have covered their requirements for a considerable period ahead. Specifications against contracts are coming in freely, and it is stated that discounts are being very firmly maintained.

**Coke.**—The market has been fairly active and several large contracts for delivery over first half and some over all of next year have been closed. The largest of these is the contract of the Wheeling Steel & Iron Company for 30,000 tons per month running over all of next year to supply its three blast furnaces, this large order having been taken by a local interest at a price close to \$3 per net ton at oven. It is probable that this contract would have brought \$3.25 had it been only for first half, but as it runs through all of next year it went at a lower price. It is stated that a Canadian consumer has also closed for about 12,000 tons a month for delivery over all of next year at about \$3 a ton at oven. The Sharpville Furnace Company has also closed for about 5000 tons a month for first half of next year for its blast furnace at Sharpville, Pa. It is said that this contract went at about \$3.25 per ton at oven. The Pittsburgh Steel Company is sounding the market for about 30,000 tons of coke per month commencing May 1 of next year. Standard grade furnace coke for prompt shipment commands \$4 a ton at oven and we note sales of 7000 to 8000 tons at this price. We quote for first half of next year at \$3.10 to \$3.25 per net ton at oven. Coke makers are now willing to concede that they cannot obtain \$3.50 for furnace coke for first half. Standard makes of 72-hour foundry coke for prompt shipment are still held at \$4.25 to \$4.50, and for first half of next year from \$3.75 to \$4 per net ton at oven is quoted. The Connellsville Courier reports that the output of coke in the Upper and Lower Connellsville regions last week was 404,652 net tons, an increase over the previous week of 4044 tons.

**Iron and Steel Scrap.**—The scrap market has exhibited a firmer tone in the past week, although prices are not quotably higher. The Interstate Commerce Commission has been looking into the situation and has given orders that where a large number of cars are loaded with scrap and are standing on tracks they will have to be moved or unloaded. This is causing a good deal of scrap to be forced on the market, and has helped to depress prices. A sale of 1000 tons of heavy steel scrap is reported at \$14.75 delivered at buyer's mill in the Pittsburgh district. Dealers quote, per gross ton, as follows:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	\$14.75 to \$15.00
No. 1 foundry cast	14.50 to 14.75
No. 2 foundry cast	13.50 to 13.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	12.75 to 13.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	16.25 to 16.50
No. 1 railroad malleable stock	14.25 to 14.50
Grate bars	10.75 to 11.00
Low phosphorus melting stock	18.25 to 18.50
Iron car axles	24.25 to 24.75
Steel car axles	17.75 to 18.00
Locomotive axles, steel	21.75 to 22.00
Locomotive axles, iron	27.75 to 28.00
No. 1 busheling scrap	14.25 to 14.50
No. 2 busheling scrap	9.75 to 10.00
Old car wheels	15.75 to 16.00
*Cast iron borings	9.90 to 10.00
*Machine shop turnings	10.50 to 10.75
†Sheet bar crop ends	16.50 to 16.75
Old iron rails	16.25 to 16.50
No. 1 railroad wrought scrap	15.00 to 15.25
Heavy steel axle turnings	12.75 to 13.00
Stove plate	10.75 to 11.00

\*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

## Chicago

CHICAGO, ILL., December 4, 1912.—(By Telegraph.)

While steel mills have obtained some slight encouragement from the diminished specifications of last week, this lighter demand may be attributed to the holiday interruption, particularly in view of the heavier specifications received at the beginning of the current week. Not only are the demands for car building materials heavier, but specifications from jobbers and bridge and boiler shops continue surprisingly insistent. New structural tonnage for building purposes is somewhat lighter, owing to the fact that projects have been delayed because of the recognized inability to obtain steel. Car inquiries include 3000 for the Minneapolis & St. Louis and 1400 for the Denver, Northwestern & Pacific. The Burlington has ordered 1500, the New York Central Lines 1000, and specifications are noted from a prominent car builder for material for an additional 1000. The policy of large independent mills not to accept further business is now well defined, while the demand upon jobbers' stocks has considerably limited their resources of material. Comparatively little interest has been displayed in pig iron, although the market continues very firm. Several sales of 500 to 1000 tons are reported, but these are without special significance, except for a limited quantity of spot iron from the South which was moved without much difficulty at about the market price.

(By Mail)

**Pig Iron.**—Sales of 500 tons of Southern foundry iron to a local stove maker and of 1000 tons to a Milwaukee stove foundry are the important transactions in a generally featureless week of trade. A Michigan malleable foundry was also in the market for 500 tons and an implement manufacturer is about to close for a like tonnage. A number of carloads of spot Southern iron have been sold here during the week and for the most part brought approximately the market price. For such spot iron \$14, Birmingham, was made on No. 2 and this price also obtains on some Tennessee irons for first quarter shipment. Standard Birmingham irons are now quoted at \$14.50 for first quarter with an advance of 50c. for second quarter. Ohio silvery iron is offered on the basis of \$21.40 delivered for 8 per cent. for the remainder of the year with a premium of 50c. each for first and second quarters. Local furnaces are under heavy pressure to make deliveries scheduled this year and their position on prompt shipment iron is particularly firm. For first quarter the market price continues at \$18, with \$18.25 asked for some brands, f.o.b. furnace. We quote local irons, f.o.b. furnace, the average switching charge to Chicago foundries being about 50c. a ton. Other quotations are for Chicago delivery. Prices on prompt shipment are as follows:

Lake Superior charcoal, Nos. 1, 2, 3, 4	\$18.75 to \$19.75
Northern coke foundry, No. 1	18.50 to 18.75
Northern coke foundry, No. 2	18.00 to 18.25
Northern coke foundry, No. 3	17.50 to 18.00
Southern coke, No. 1 foundry and No. 1 soft	18.85 to 19.35
Southern coke, No. 2 foundry and No. 2 soft	18.35 to 18.85
Southern coke, No. 3	17.85 to 18.35
Southern coke, No. 4	17.35 to 17.85
Southern gray forge	17.35 to 17.85
Southern mottled	16.85
Malleable Bessemer	18.00 to 18.25
Standard Bessemer	19.40 to 19.90
Basic	18.00 to 18.25
Jackson Co. and Kentucky silvery, 6 per cent.	20.40
Jackson Co. and Kentucky silvery, 8 per cent.	21.40
Jackson Co. and Kentucky silvery, 10 per cent.	22.40

**Rails and Track Supplies.**—The week brought out no important developments in the placing of rail tonnage, and specifications for track fastenings were somewhat lighter. We quote standard railroad spikes at 1.95c. to 2.05c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, \$32 to \$34.50 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

**Structural Material.**—A number of building projects are being delayed because of inability to obtain steel, and while in some instances, as in the case of the Morrison Hotel and the Stevens store and office building, figures are being taken, the source of steel supply is a matter of conjecture. The only contract of importance for fabricated steel placed during the week covered 795 tons of bridge steel for the Chicago, Burlington & Quincy Railroad, to be furnished by the American Bridge Company. Competition among fabricators at present is a question of deliveries rather than price. The mill situation shows no change as yet, but specifications are expected to be somewhat lighter during the remainder of the year, affording at least slight relief



from the increasing accumulations of the past several months. Car structural shapes continue to make up a large portion of current orders. Prices are unchanged and we quote for Chicago delivery from mill, plain shapes 1.63c. to 1.90c.

Jobbers are sharing with other buyers of steel the difficulties attendant upon obtaining structural steel from the mills and their facilities are in turn correspondingly limited. We quote for base sizes out of store, 2.05c.

**Plates.**—Among current specifications of the past week were about 11,000 tons of car plates and shapes for a Michigan car builder. The placing of orders for 1000 cars with the Standard Steel Car Company by the New York Central Lines is also noted. Most of the independent mills continue the policy of accepting no further business as they are now filled up for practically the entire first half. We quote for Chicago delivery, mill shipment, 1.63c. to 1.88c.

We quote for base sizes from store, 2.05c.

**Sheets.**—A moderately active inquiry for sheets continues, but regular users are now fairly well covered for their requirements and until after the first of the year new business is expected to appear in decreasing quantity. Prices are unchanged and we quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.53c.; No. 28 galvanized, 3.68c.; No. 10 blue annealed, 1.83c. to 1.88c.

Store conditions in the matter of sheet stocks give promise of being easier as the pressure of new business slackens somewhat, but the jobbers continue to be the only source of supply for shipment within two weeks. We quote on sheets out of store as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.80c., and No. 28 galvanized, 4.05c.

**Bars.**—Notwithstanding the holiday interruption of the past week current orders for bar iron were more than comfortably brisk and previous minimum prices continue to be firmly maintained. Steel bar specifications, while slightly off in tonnage, were none the less insistent as to delivery and new orders were placed only at premiums over the nominal market. The close of the building season will relieve somewhat the pressure on the hard steel bar mills. We quote for mill shipment as follows: Bar iron, 1.55c. to 1.60c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.60c. to 1.70c.; shafting in carloads, 60 per cent. off; less than carloads, 55 per cent. off.

For delivery from store, we quote soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes  $\frac{3}{4}$  in. and over, and  $\frac{7}{8}$ c. extra for smaller sizes; shafting 55 per cent. off.

**Rivets and Bolts.**—Bridge and structural shops appear to have pretty well covered their rivet requirements for the first quarter, but a considerable tonnage of structural fabricating now delayed because of inability to obtain steel is expected to materially increase the demand in the spring months. Prices are unchanged. We quote from mill as follows Carriage bolts up to  $\frac{3}{4}$  x 6 in., rolled thread, 75-10-2 $\frac{1}{2}$ ; cut thread, 75-7 $\frac{1}{2}$ ; larger sizes, 70-5; machine bolts up to  $\frac{3}{4}$  in. x 4 in., rolled thread, 75-10-7 $\frac{1}{2}$ ; cut thread, 75-10-2 $\frac{1}{2}$ ; large sizes, 70-10; coach screws, 80-10; hot pressed nuts, square head, \$5.80 off per cwt.; hexagon, \$6.40 off per cwt. Structural rivets,  $\frac{3}{4}$  to 1 $\frac{1}{4}$  in., 2.28c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to  $\frac{3}{4}$  x 4 in., 70-12 $\frac{1}{2}$ ; larger sizes, 65-10; carriage bolts up to  $\frac{3}{4}$  x 6 in., 70-10; larger sizes, 65-5 off. Hot pressed nuts, square head, \$5.40, and hexagon, \$6 off per cwt.

**Wire Products.**—Wire tonnage in November failed to equal that of October but exceeded the November business of the last two years. Had the demand been heavier, the shortage of steel and plain wire for fabrication would have been even more pronounced. Attention in the wire products trade is largely centered in preparations for spring business, this being especially true of manufacturers. We quote plain wire, No. 9 and coarser, base, \$1.68 to \$1.73; wire nails, \$1.88 to \$1.93; painted barb wire, \$1.88 to \$1.93; galvanized, \$2.28 to \$2.33; polished, staples, \$1.88 to \$1.93; galvanized, \$2.28 to \$2.33, all Chicago.

**Cast Iron Pipe.**—The firmness of the pig iron market is expected to result in inquiries for cast iron pipe from some of the important municipal users in December, but thus far there is little tonnage offering. Figures are being taken at Winnipeg on 500 tons. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$31; 6 to 12 in., \$29; 16 in. and up, \$28, with \$1 extra for gas pipe.

**Old Material.**—The decline in the prices of scrap was arrested the past week, possibly because the current demand was so limited as to offer little opportunity for trading. An embargo obtains at the plants of

some of the largest scrap melters in this market, which is at least indicative that the movement of old material to the consumer has not yet materially slackened. Some promise is offered that the excess of scrap in the market will be absorbed in the purchases of the Illinois Steel Company for its Gary plant, this company being in the market for shoveling steel. The Railway Steel Spring Company, at its Chicago Heights plant, since its furnaces have been changed over to a basic lining, is also a melter of heavy melting steel. The somewhat belated offering of scrap by the railroads, particularly of old rail steel, is beginning to make its appearance. In a current list of 5000 tons from the Chicago & Northwestern, an item of 2000 tons of old steel rails is noted. The Erie Railroad also has a list. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	\$18.00 to \$18.50
Old steel rails, rerolling	16.25 to 16.75
Old steel rails, less than 3 ft.	14.50 to 15.00
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	16.75 to 17.25
Heavy melting steel scrap	13.00 to 13.50
Frogs, switches and guards, cut apart	13.00 to 13.50
Shoveling steel	12.75 to 13.25
Steel axle turnings	11.00 to 11.50

Per Net Ton.	
Iron angles and splice bars	\$16.00 to \$16.50
Iron arch bars and transoms	16.75 to 17.25
Steel angle bars	12.75 to 13.25
Iron car axles	21.50 to 22.00
Steel car axles	17.75 to 18.25
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	12.00 to 12.50
Cut forge	12.00 to 12.50
Steel knuckles and couplers	12.75 to 13.25
Steel springs	13.25 to 13.75
Locomotive tires, smooth	14.00 to 14.50
Machine shop turnings	8.25 to 8.75
Cast and mixed borings	7.00 to 7.50
No. 1 busheling	11.25 to 11.75
No. 2 busheling	8.25 to 8.75
No. 1 boilers, cut to sheets and rings	9.50 to 10.00
Boiler punchings	12.50 to 13.00
No. 1 cast scrap	13.00 to 13.50
Stove plate and light cast scrap	10.75 to 11.25
Railroad malleable	13.50 to 14.00
Agricultural malleable	11.75 to 12.25
Pipes and flues	10.25 to 10.75

## Philadelphia

PHILADELPHIA, PA., December 3, 1912.

The pig iron market has been quiet, but the demand for finished and semi-finished products shows no slackening. Prices are exceedingly strong. Offers of premiums for prompt shipment continue, but mills are not in a position to accept the business offered. Billet makers here have opened order books for the second quarter, making sales of rolling steel at \$32. Shipyards are inquiring for further supplies of materials. In all lines consumers are urging producers for delivery against contracts. Bars continue scarce. The demand for old material is lighter and prices are weak. Coke is in moderate demand with prices unchanged.

**Iron Ore.**—Sales have been unimportant, although several furnaces have not closed for their usual supply of Lake ore for next year. A little business in local ore has been done, but the movement in foreign ore, except an occasional cargo of low phosphorus, is practically at a standstill. Importations during the week were confined to a cargo of 2200 tons of Cuban ore.

**Pig Iron.**—Transactions have been considerably lighter, although inquiry in the foundry grades has been quite good, covering moderate lots for first quarter and half of next year. Consumers are strenuously endeavoring to have producers make prompt deliveries and even anticipate shipments on contracts, but furnaces, having a minimum stock on their yards, find it difficult to satisfy all their customers from their current make. Few producers are aggressively seeking business for either prompt or first quarter delivery. Moderate sales of the higher foundry grades make up the bulk of the week's business. Standard analysis eastern Pennsylvania brands of No. 2X are selling at \$18.50, delivered, with occasional small, prompt lots at \$18.75 and slightly higher. A Delaware River pipe foundry has closed for several thousand tons of low grade iron, taking part Southern and part Pennsylvania iron. Other pipe foundries, while not making definite inquiries, would purchase odd lots at prices satisfactory to themselves. Ordinary pipe making grades are quoted at about \$17.75, delivered at Delaware River points. Small sales of Virginia foundry grades have been made for prompt and first quarter at \$16, furnace,

for No. 2X, although quotations frequently show considerable variance; due to condition of sellers' order books. Charcoal iron for car wheel making has been sold in small lots, while moderate inquiry for prompt coke malleable is noted. The demand for rolling mill forge has been quieter, but a few sales of small lots have been made at \$17.75, delivered. There has been no inquiry for basic by steel mills in the East, although one for several thousand tons for Western shipment has come out. Sales of low phosphorus iron have been confined to small, odd lots at \$24.50, delivered, although on desirable business this price can be shaded 50c. Notwithstanding quieter general market conditions, prices are very firm, with producers disinclined to sell for extended shipment. For delivery in buyers' yards in this district, December or the first quarter of 1913, the following range of prices is named for standard brands:

Eastern Pennsylvania No. 2 X foundry....	\$18.50 to \$18.75
Eastern Pennsylvania No. 2 plain.....	18.25 to 18.50
Virginia No. 2 X foundry.....	18.80 to 19.00
Virginia No. 2 plain.....	18.55 to 18.75
Gray forge .....	17.75
Basic (nominal) .....	18.25 to 18.50
Standard low phosphorus .....	24.00 to 24.50

**Ferroalloys.**—Sellers are practically at a loss for official quotations for 80 per cent. ferromanganese for next year's delivery. Several producers have withdrawn quotations and a higher range of prices is looked for. Prompt ferromanganese is quoted at \$75 to \$80, seaboard; for first half quotations nominally range from \$62 to \$63, while \$61 is nominally quoted for second half shipment, although an advance to \$65, seaboard, is expected. Very little business is moving. Fifty per cent. ferrosilicon is firm; furnace grades have been sold in small lots for extended delivery, 12 per cent. being quoted at \$29.30, delivered. Importations of ferromanganese at this port last week aggregated 1212 tons.

**Billets.**—Eastern makers have opened order books for second quarter of next year, business being entered at the same price which has prevailed for first quarter—\$32, delivered, for basic open hearth rolling steel, and \$36, at mill, minimum basis for ordinary forging billets. Producers are well covered for prompt and first quarter shipments and could obtain fancy premiums if they could take on further business. An inquiry for 5000 tons of standard rolling billets, for delivery extending over the first quarter, has been circulating in this district for a week without finding a taker.

**Plates.**—New business continues to come to mills in good volume, and some producers are unable to make deliveries within 10 weeks. Contracts for first quarter requirements are being freely entered at 1.75c. for sheared and 1.80c. for universal plates, delivery in this vicinity. Prompt plates are extremely hard to get. Heavy inquiries for car plates are still before the trade, while new inquiries for several thousand tons of ship plates, for estimating purposes, have come out. Eastern mills continue to operate at top capacity and are gradually falling behind in deliveries.

**Structural Material.**—Inquiry for plain shapes has been confined principally to small, miscellaneous business, although negotiations are still pending for considerable car material for extended delivery. Additional inquiry for boat shapes has also developed. Few large propositions have developed in fabricated structural work. The Philadelphia & Reading Railroad has placed orders for small bridge work. Several building projects are in sight, but develop slowly. Mills continue to find difficulty in meeting customers' demands for delivery. Quotations for plain shapes are unchanged, 1.60c., delivered here, being named for indefinite extended shipment, while for reasonably early delivery 1.70c. to 1.75c. about represents the market.

**Sheets.**—Eastern sheet mills are unable to accept new orders for delivery inside of six to eight weeks and are now entering contracts for first quarter shipments. Western sheets are extremely scarce, many makers being practically sold up for the first half of next year. Mills are operating at full capacity and steadily falling behind in deliveries. Prompt sheets, when available, command sharp premiums. Western No. 10 blue annealed sheets, for indefinite delivery, are quoted at 1.80c. here. Eastern mills making smooth, loose-rolled sheets easily obtain 2.05c., delivered, for reasonably early shipment.

**Bars.**—There is an active demand for both steel and iron bars. Mills in this vicinity are operating at full capacity and preparations are being made to get additional plants in operation. Prompt bars are in particularly good demand and quick shipments command fancy prices. Business in iron bars is being entered for extended shipment at 1.67½c., delivered, although

for any kind of early delivery 1.77c. is paid, and special bars command even higher prices. Prompt steel bars are quoted at 1.85c., delivered, although contracts are being entered at 1.55c. to 1.60c., delivered.

**Coke.**—While some fair sized contracts in both furnace and foundry coke are pending, the actual movement has been comparatively light. Consumers are waiting for indications of further price recessions before placing orders. Considerable variation in prices is still reported, depending largely on grade, quantity and delivery. Prices are practically unchanged, the following range, per net ton, being named for delivery in buyers' yards in this district:

CConnellsville furnace coke .....	\$5.00 to \$5.75
CConnellsville foundry coke .....	6.00 to 6.50
Mountain furnace coke .....	4.50 to 5.50
Mountain foundry coke .....	5.60 to 6.25

**Old Material.**—Further weakness has developed in the leading grades and the tendency is still downward. Steel mills are not in the market for No. 1 heavy melting steel for early delivery, but will pick up odd lots at bargain prices. One large consumer is embargoed. Occasional sales of moderate lots of No. 1 steel have been made down to \$14.50, delivered, although dealers pay better than that price for steel to apply on contracts, and in a number of instances have bid close to \$15, on railroad lists. For shipment early next year \$15.50 could no doubt easily be done for this grade. Rolling mill grades are uncalled for and show decided price weakness on forced sales. Borings and turnings are quiet. A slightly better movement in machinery cast scrap is noted. Prices are irregular, holders refusing, in cases, to let go of material under present conditions, while forced sales are made at prices which sometimes are considerably under the minimums quoted. The following range of prices is named for prompt delivery in buyers' yards in this district, covering eastern Pennsylvania and nearby points, taking a freight rate ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap and crops.....	\$15.00 to \$15.50
Old steel rails, rerolling (nominal).....	17.00 to 17.50
Low phosphorus heavy melting steel scrap.....	18.75 to 19.25
Old steel axles .....	20.00 to 20.50
Old iron axles .....	26.00 to 27.00
Old iron rails .....	18.50 to 19.00
Old car wheels .....	15.00 to 15.50
No. 1 railroad wrought (nominal).....	16.50 to 17.00
Wrought iron pipe .....	13.50 to 14.00
No. 1 forge fire .....	13.50 to 14.00
No. 2 light iron (nominal) .....	8.00 to 8.50
Wrought turnings .....	11.00 to 11.50
Cast borings .....	11.00 to 11.50
Machinery cast .....	15.00 to 15.50
Grate bars, railroad .....	11.50 to 12.00
Stove plate .....	11.50 to 12.00
Railroad malleable (nominal) .....	13.50 to 14.00

## Cleveland

CLEVELAND, OHIO, December 3, 1912.

**Iron Ore.**—The market has been very active in the past few days. Previous to the past week sales of non-Bessemer ore in the Central West had been almost entirely confined to the higher grades. This limited buying movement, however, has been followed by a general buying of all grades of non-Bessemer ores by merchant furnaces in the Central West. The demand for Lake Superior non-Bessemer ore in the East reported a week ago has continued and several additional round lots have been disposed of. Considerable eastern business is still in prospect both from steel companies and merchant furnaces. Ore men expect the sales of Lake Superior ore in the East for next season delivery will reach at least 2,000,000 tons. The high price of coke is causing more demand for the high grades of ore, every effort being made to reduce fuel consumption. While some merchant furnace interests are inclined to defer their own buying until spring, believing that the mines can produce all the ore that can possibly be needed next season and that they can secure what they want in the spring, ore men see a possibility that because of the labor situation they may be unable to get out as much ore as is wanted should the demand be greatly in excess of that of the present season. Stock piles were well cleaned up this year and unless there is an influx of labor from Europe during the next few months there may be a labor shortage in the mines. The shipments for the season were practically over in November. However, a few small cargoes were dispatched from the upper lake ports during the early part of this week. We quote prices as follows: Old Range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; Old Range non-Bessemer, \$3.60, and Mesaba Bessemer, \$3.40.

**Pig Iron.**—There is practically no activity in the market. Prices on Northern grades are very firm. One



local furnace that made some sales recently at \$17, furnace, for No. 2, has advanced its price to \$17.50, which is the general Valley quotation. The only sales reported are a few very small lots of foundry grades. Foundries in general are well covered through at least the first quarter and little demand is looked for in December. Sellers expect that the buying for the last half will start early in the year. There are a few small inquiries for Southern grades. While Southern iron is generally held at a minimum of \$14, Birmingham, for spot shipment and the first quarter, some resale iron is still being offered at \$13.50 for early delivery. For prompt shipment and for the first quarter of 1913 we quote, delivered, as follows:

Bessemer .....	\$18.15 to \$18.40
Basic .....	17.40
Northern No. 2 foundry .....	17.75 to 18.00
Southern No. 2 foundry .....	18.35 to 18.60
Gray forge .....	17.00 to 17.25
Jackson County silvery, 8 per cent. silicon ..	20.50 to 21.55

**Coke.**—The Struthers Furnace Company has sold about 15,000 tons of furnace coke for delivery in the next few weeks at a price close to \$4. This coke was thrown on the market because of the blowing out of the company's furnace for relining. There is some inquiry for foundry coke for the first half, all the foundries in this territory not being covered. The supply of foundry coke is scarce and some producers have advanced their first half price from \$4 to \$4.50. We quote standard Connellsville furnace coke at \$4 per net ton at oven for prompt shipment and \$3.25 to \$3.50 for contract. Foundry coke is held at \$4.50 to \$4.75 for prompt shipment and \$4 to \$4.50 for contract.

**Finished Iron and Steel.**—There is not a great deal of new demand, but mills could take on a considerable tonnage on contracts if they were willing to book additional business. Contracts now outstanding fairly well cover consumers for their first quarter and first half requirements. Most mill agencies report the pressure for deliveries unabated and generally the mills are getting in no better shape on shipments, although one producer has caught up somewhat on light bar products and is able to promise shipments on these products in February. Local warehouse prices were advanced this week \$3 a ton on steel bars to 2.10c., and \$2 a ton on plates and structural material to 2.25c. Warehouse prices on sheets are unchanged. The demand for material out of stock continues very heavy and warehouse stocks are getting in a more unsatisfactory condition, the supply of many sizes being exhausted. Mill prices are unchanged at 1.40c. to 1.45c. for steel bars and 1.45c. to 1.50c. for plates and shapes for future delivery. Quotations of Eastern mills are 1.60c. on plates and 1.65c. on structural material with an advance over these prices for early delivery. Bar iron is firm at 1.60c. to 1.70c. at mill. Makers of hard steel report a very heavy demand for angles and a less active demand for bars. For the latter they are now quoting 1.45c. for prompt shipment and 1.50c. for contract. Hard steel angles are quoted at 1.55c. for carload lots. The new demand for structural material is light. A large amount of tonnage is in prospect for building work in this city, inquiries for which will not be out until early in the year. An Eastern mill that had a few forging billets to offer made carload sales in this market in the week at \$35 at mill. Sheet specifications continue very heavy.

**Old Material.**—The market is very quiet. Prices are weak, although nominal quotations are unchanged. Mills are well supplied for the remainder of the year and do not care to take on additional tonnage, although dealers would make some price concessions to move material. While the consumption is heavy little new demand is expected before January. Railroad lists out this week include the Erie, which closes Tuesday; the Pennsylvania Lines West, on which bids will be received on December 5, and a small Big Four list. We quote, f.o.b. Cleveland, as follows:

*Per Gross Ton.*

Old steel rails, rerolling .....	\$15.00 to \$15.50
Old iron rails .....	17.50 to 18.00
Steel car axles .....	18.75 to 19.25
Heavy melting steel .....	13.50 to 14.00
Old car wheels .....	13.50 to 14.00
Relaying rails, 50 lb. and over .....	23.00 to 23.50
Agricultural malleable .....	12.50 to 13.00
Railroad malleable .....	14.00 to 14.50
Light bundled sheet scrap .....	12.50 to 13.00

*Per Net Ton.*

Iron car axles .....	\$21.00 to \$22.00
Cast borings .....	8.25 to 8.50
Iron and steel turnings and drillings .....	9.00 to 9.25
Steel axle turnings .....	9.25 to 9.50
No. 1 busheling .....	12.00 to 12.50
No. 1 railroad wrought .....	14.00 to 14.50
No. 1 cast .....	13.00 to 13.50
Stove plate .....	10.00 to 10.50
Bundled tin scrap .....	11.00 to 11.50

## Boston

BOSTON, MASS., December 3, 1912.

**Old Material.**—The market has not strengthened and prices have again receded slightly on skeleton, wrought iron pipe and cotton ties. The quotations given below are prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel .....	\$12.00 to \$12.25
Low phosphorus steel .....	14.00 to 15.00
Old steel axles .....	15.00 to 15.50
Old iron axles .....	23.00 to 23.50
Mixed shafting .....	14.75 to 15.25
No. 1 wrought and soft steel .....	12.25 to 12.75
Skeleton (bundled) .....	10.00 to 10.50
Wrought iron pipe .....	10.50 to 10.75
Cotton ties (bundled) .....	10.00 to 10.50
No. 2 light .....	4.50 to 5.00
Wrought turnings .....	8.00 to 8.25
Cast borings .....	7.75 to 8.00
Machinery, cast .....	13.50 to 14.00
Malleable .....	11.00 to 11.50
Stove plate .....	9.00 to 9.50
Grate bars .....	8.00 to 8.25
Cast-iron car wheels .....	13.50 to 14.00

## Cincinnati

CINCINNATI, OHIO, December 4, 1912—(By Telegraph).—

**Pig Iron.**—The Southern market has not improved, and prices on spot shipment are weak. Sales of December foundry iron have been made as low as \$13.50, Birmingham basis, for No. 2 foundry, although an equal tonnage has been disposed of at \$14 at furnace and prices for first quarter shipment are strong at that figure. Although a number of furnaces are quoting all the way from \$14.50 to \$15 for second quarter, there is no indication that buyers care to take hold just at the moment, and it will probably be well along in January before contracting for this delivery will be done. Northern iron is very strong, as the high price of coke, coupled with well-filled order books, precludes any possibility of a material reduction of the regular quotation of \$17, Ironton, on No. 2 foundry, with the exception of a limited quantity of special analysis iron held by dealers that is obtainable below this figure for December shipment. The inquiry is light, but a Michigan melter is expected to close this week for 1500 tons of foundry iron for December-March shipment and a central Ohio firm wants 1000 tons of analysis iron for the same delivery. A Western melter closed this week for 500 tons of Southern No. 2 foundry at \$14, Birmingham, for December shipment, and a local company took about 400 tons at the same price, with deliveries extending through the next three months. All iron merchants report urgent demands from melters for shipments on contracts. Basic is not active, but a St. Louis consumer will probably close for 2000 tons for first half within the next few days. As a rule, neither Northern nor Southern furnaces are anxious to quote for strictly second quarter business, and prices previously made have in some instances been withdrawn. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft ..	\$17.50 to \$17.75
Southern coke, No. 2 foundry and 2 soft ..	17.25 to 17.50
Southern coke, No. 3 foundry .....	17.00 to 17.25
Southern, No. 4 foundry .....	16.75 to 17.00
Southern gray forge .....	16.50 to 16.75
Old silvery, 8 per cent. silicon .....	20.20 to 20.70
Southern Ohio coke, No. 1 .....	18.70 to 19.20
Southern Ohio coke, No. 2 .....	18.20 to 18.70
Southern Ohio coke, No. 3 .....	17.95 to 18.45
Southern Ohio malleable Bessemer .....	17.70 to 18.20
Basic, Northern .....	18.20 to 18.70
Lake Superior charcoal .....	19.25 to 19.75
Standard Southern car wheel .....	25.75 to 26.25

*(By Mail)*

**Coke.**—Prompt shipment coke is still bringing a high premium, and there are no indications of any relief. Connellsville furnace coke has brought over \$4 per net ton at oven in a few sales made lately, and while it is rumored that first half contracts can be made below \$3.25 it is probable that special conditions prevailed if the quantity involved amounted to very much. A local agency is said to have closed for about an 800-ton monthly supply of furnace coke to be shipped to another territory, but with this exception there is very little business to be reported. Connellsville foundry coke is quoted all the way from \$4 to \$4.75 for nearby

shipment, and a small quantity of 72-hr. coke for domestic use has been taken at \$5 per net ton at oven. Contract foundry grades can be obtained at figures close to those named for furnace coke. Wise County and Pocahontas producers are holding out for the same prices on prompt shipment coke, but contract quotations are about 25c. a ton below those for Connellsville brands. Few producers are willing to make contracts extending beyond July 1.

**Finished Material.**—The chief concern of mill agencies is to take care of customers on shipments that are due on contracts. On structural material especially there is not much chance to get promises for delivery before July 1, although warehouse stocks have taken care of a number of small customers. Prices are unchanged, and local warehouses are quoting 2.15c. on steel bars and from 2.20c. to 2.25c. on structural material. The demand for sheets is holding up fairly well.

**Old Material.**—Business is very slow, and the recent sharp advances were probably premature on a number of grades. However, there are no reductions that can be made this week, and it is the prediction of leading scrap dealers that prices will remain around the present quotations until after the holidays. The figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton.	
Bundled sheet scrap	\$10.25 to \$10.75
Old iron rails	14.50 to 15.00
Relaying rails, 50 lb. and up.	21.50 to 22.00
Re-rolling steel rails	13.50 to 14.00
Melting steel rails	11.50 to 12.00
Old car wheels	13.00 to 13.50

Per Net Ton.	
No. 1 railroad wrought	\$11.50 to \$12.00
Cast borings	7.50 to 8.00
Steel turnings	8.00 to 8.50
No. 1 cast scrap	11.25 to 11.75
Burnt scrap	8.00 to 8.50
Old iron axles	18.50 to 19.00
Locomotive tires (smooth inside)	12.00 to 12.50
Pipes and flues	8.00 to 8.50
Malleable and steel scrap	9.50 to 10.00
Railroad tank and sheet scrap	7.00 to 7.50

## Birmingham

BIRMINGHAM, ALA., December 2, 1912.

**Pig Iron.**—The market continues very firm. No disposition is seen to shade prices, despite the rumors emanating from other iron centers as to the offering of Alabama pig iron below the schedule reported here. Iron so offered is undoubtedly re-sale iron, evidently representing the sale of warrants purchased at much lower figures, it doubtless having been thought advisable by purchasers to begin to realize on such investments. Sales the past week have been of moderate lots, but this is nothing more than was expected, for there is really little iron available to be offered for shipment in the next four months. Second quarter iron continues to bring \$15, Birmingham, while the price remains at \$14.50 on 2 foundry base for first quarter. The producing rate has been increased by the blowing in of the stack of the Central Iron & Coal Company at Holt, Ala. The Alabama furnaces are very much interested in the export iron market, but the inability to secure bottoms in which to forward Birmingham iron from the South Atlantic and Gulf ports to Italy precludes the taking of all the business that has been offered from that country in recent months. Charcoal iron continues in very fair demand and brings \$25 and higher for any and all grades f.o.b. cars at furnaces. The local market is fairly represented on the following schedule of prices, all per gross ton, f.o.b. cars at furnaces, Birmingham district:

No. 1 soft and foundry	\$14.50 to \$15.00
No. 2 soft and foundry	14.00 to 14.50
No. 3 foundry	13.75 to 14.25
No. 4 foundry	13.50 to 14.00
Gray forge	13.25 to 13.75
Basic	14.00 to 14.50
Charcoal	25.00 to 25.50

**Cast Iron Pipe.**—The local water pipe makers are enjoying an unusual run of good business. While the shipments moving out at this time are largely on orders taken below prices ruling to-day, yet it is likewise true that these pipe makers are using iron bought at much lower prices. The demand for pipe comes from all sections of the country. It has been demonstrated that cast iron pipe can be produced in this district at figures that will enable Birmingham to compete with all other pipe producing districts and the year 1912 has proved one of the biggest from a tonnage stand-

point ever experienced by the water pipe makers as well as the sanitary pipe producers. It is expected that pipe for water and gas mains will show some further advance early in the year, but meanwhile quotations remain as follows, per net ton, f.o.b. cars, at foundries in this district: 4 in., \$25; 6 in. and up, \$23, with \$1 added for gas pipe.

**Old Material.**—Dealers report the market here for cast iron scrap more active than at any time in the past 18 months. The higher prices on pig iron are causing consumers to use more cast scrap than would ordinarily be the case, with the result that this class of material has been marked up somewhat in sympathy with pig iron. There is also a fair demand for wrought scrap from points like Chattanooga, Atlanta and Gadsden, as well as Birmingham. Dealers' prices, per gross ton, f.o.b. cars in their yards, Birmingham, are pretty well established as follows:

Old iron axles	\$16.50 to \$17.50
Old steel axles	15.50 to 16.00
Old iron rails	14.50 to 15.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	11.50 to 12.00
No. 1 heavy melting steel	11.50 to 12.00
Tram car wheels	12.00 to 12.50
Standard car wheels	13.00 to 13.50
Light cast and stove plate	9.50 to 10.00

**Coal and Coke.**—The car question is a more important factor in the coal and coke market than any other one feature. It is generally understood that the shortage of cars is going to affect the tonnage of coal produced this year in Alabama. As a result of this shortage of cars, there has in some cases been a material advance in some grades of steam coal. The recent cold weather has developed an acute shortage of domestic coal, and the prices for that grade are higher than in several years. The coke market continues active, and with the high prices ruling in Virginia, West Virginia and the Connellsville region there has developed considerable inquiry for Alabama coke to be shipped to the Central West, Far West and to Mexico. Birmingham will not reap its full advantage of this situation, however, by reason of inability to secure suitable cars in which to ship. There is no material change in the quotations on coke, the best foundry grades bringing \$3.75 to \$4.25 per net ton at the ovens here.

## Buffalo

BUFFALO, N. Y., December 3, 1912.

**Pig Iron.**—The market has been quiet for the week as regards new business, but the volume of shipments from furnaces on contracts was very large. There is evidence on every side of continually increasing consumption, business now coming to melters being very heavy. It would appear from the indications of the week, however, that for the present foundries instead of placing filling-in orders are endeavoring to draw on their reserve supply already contracted for and requesting furnaces to anticipate deliveries as far ahead of contract schedules as possible, calling for December shipments of their January quotas. Furnaces, however, are utterly unable to comply to the extent asked, notwithstanding November production has been exceedingly heavy. It develops now that users as a rule erred on the conservative side in ordering for fourth quarter requirements and will be obliged largely to increase their placements later on. Prices for all grades are very firm and one of the largest producing interests, which is practically out of the market for the present on account of its sold up condition, is quoting \$18 as its minimum for all grades, including No. 4 iron. The coke situation appears to be easing up a trifle, which is very opportune for many of the foundries anxious to accumulate some stock ahead on account of the near approach of winter with the trying transportation conditions. We quote as follows for first half delivery, f.o.b. Buffalo:

No. 1 foundry	\$18.00 to \$18.25
No. 2 X foundry	17.75 to 18.00
No. 2 plain	17.50 to 17.75
No. 3 foundry	17.25 to 17.50
Gray forge	17.00 to 17.25
Malleable	17.75 to 18.25
Basic	18.00 to 18.25
Charcoal, regular brands and analysis	18.75 to 19.25
Charcoal, special brands and analysis	22.00

**Finished Iron and Steel.**—The mills are continuing their passive attitude in regard to the booking of further tonnage. Some of the mill interests are taking care of a portion of their old contract customers, while other mills are declining to enter additional tonnage at



this time even with regular contract customers who are endeavoring to cover themselves for the last half of next year. The only exception to the current practice of turning down old customers on the extension of contracts is for implement steel, implement makers coming into the market at this time for their annual contract requirements of steel. In structural material very good premiums are paid for occasionally prompt shipment even for odd sizes. Some of the smaller mills are still making fairly prompt delivery on urgent orders. The structural steel for two factory buildings for the Atlas Crucible Steel Company, Dunkirk, N. Y., has been awarded to S. Culver, of that city. Figures are being received this week for steel for an extensive addition to the Sanderson plant of the Crucible Steel Company of America at Syracuse, N. Y. The Lane Bridge Company, Painted Post, N. Y., has received contract for the structural steel work for the addition to the plant of the Knickerbocker Portland Cement Company at Hudson, N. Y. There is active demand for billets and the price is firm at \$29.50, f.o.b. Buffalo. Quite a large tonnage for Canadian export was placed during the week with the New York State Steel Company by the Canadian Steel Foundries for delivery over the next six months.

**Old Material.**—The local market has exhibited traces of dullness during the past week. The bulk of business has been with eastern Pennsylvania and Pittsburgh users and the aggregate of sales has been only moderate in volume. In consequence of the slackening in the local demand prices have weakened somewhat. We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel	\$14.50 to \$15.00
Low phosphorus steel	16.75 to 17.25
No. 1 railroad wrought	15.75 to 16.25
No. 1 railroad and machinery cast scrap	13.75 to 14.75
Old steel axles	16.50 to 16.75
Old iron axles	24.25 to 24.75
Old car wheels	15.25 to 16.00
Railroad malleable	13.25 to 13.75
Boiler plate sheared	14.75 to 15.25
Locomotive grate bars	11.50 to 12.00
Wrought pipe	10.25 to 10.75
Tank iron	10.50 to 11.00
Wrought iron and soft steel turnings	8.75 to 9.00
Clean cast borings	8.00 to 8.50

## San Francisco

SAN FRANCISCO, CAL., November 27, 1912.

A few merchants report a slight curtailment of buying in some finished products, but on the whole the distributive movement is about equal to that of October. Prospective requirements of reinforcing bars are increasing rapidly, while the local demand for roofing material and plates has dropped off a little. In southern California and some interior districts the demand in most lines is beyond all precedent, merchants reporting all the business they can possibly handle. The heavy arrivals on old orders have slightly relieved the shortage in certain lines, but buyers are greatly concerned regarding supplies for the spring trade, and specifications in general are extremely heavy.

**Bars.**—The local small distributive trade in soft steel bars is hardly so active as last month, but some large consumers are buying from store, and country business is well maintained. Stocks are in very poor shape, and while merchants are specifying on an unusually large scale, they expect little improvement in the situation for several months. The scarcity of soft steel has brought out a good demand for iron bars, and coast mills rolling this material are extremely busy. Several large inquiries are coming out for reinforcing bars, and local mills are closely sold up. Several large concrete building jobs are in sight, and new figures are being taken on the Los Angeles dock, as well as on pier 37, in this city. Open-hearth corrugated reinforcing bars, carloads, from mill, are quoted at 2.20c., and small lots from store at 2.50c., with an advance expected shortly. Merchants quote soft steel bars in small lots, from store, at 2.65c., and iron at 2.55c.

**Structural Material.**—While general building is active, few contracts recently let require much structural steel. The amount of work figured, however, is increasing, and several important jobs are expected in the next 30 days. Fabricators find it practically impossible to get delivery from mill before the second half of 1913, and are reluctant to buy so far ahead. They are accordingly taking considerable plain material from store at a slight advance over the mill basis. Preliminary drawings of the city hall steel work have been completed, and bids on a tonnage basis are to be taken immediately. All the money has been subscribed for the \$750,000 municipal opera house, and it is practically

certain that plans for the public library will be carried out. The Central Iron Works has a contract for about 150 tons for a Catholic church. Bids have been called for on the U. S. Subtreasury. Figures are also being taken on the S. & G. Gump hotel and several smaller apartment buildings. A general contract has been let for a class A school in Oakland. A contract is expected soon on the Pittock building, Portland, Ore. The Southern Pacific Railroad announces that its new passenger station in this city will be of reinforced concrete.

**Rails.**—Small orders are still being placed with considerable frequency, and a few single sales amount to several hundred tons each, though no really important business has been taken. Definite inquiries are expected at any time on several important interurban and logging roads, and the outlook is good for a heavy tonnage within the next six months. Some importance is attached to the visit of F. A. Brewer of Chicago, who proposes to finance a large timber project in this vicinity.

**Sheets.**—The local jobbing trade in galvanized sheets has been slightly curtailed in the last few weeks, and with large arrivals both by rail and sea some merchants are fairly well supplied. In other parts of the State the consuming demand is well sustained, and jobbers are still clamoring for shipments. Agents who have been taking first-quarter contracts state that most buyers have already specified their full allotments, and are now inquiring for second-quarter delivery. One or two mills which can take a limited amount of new business for shipments in two to four weeks are picking up a great many carload orders.

**Plates.**—Some shipbuilding business is still coming out, and the outlook for 1913 is encouraging, though widely circulated statements of a great shipbuilding industry in prospect for this port are probably much exaggerated. So far, at least, there is little indication that Pacific shipbuilders can compete on large new work with those on the Atlantic. No important tank or pipe contracts are reported, and manufacturers are fairly well covered for work formerly booked. Jobbing business is only moderate.

**Merchant Pipe.**—The gross tonnage taken by the principal mills is expected to show some increase for the year over 1911, but specifications from local merchants are not above normal at the moment. Los Angeles and some interior points are still specifying freely, while trade in other districts is quiet, the curtailment being attributed to the approaching inventory season. There is little inquiry for oil pipe, but the current tonnage is increased by numerous orders for water and gas works. The largest single purchase was 34,000 ft. of 16-in. pipe by the Los Angeles Gas & Electric Company. The Lawndale Land & Water Company, Los Angeles, will take bids December 15 on 10,000 ft. 2 to 8-in., and the city of Alameda will take bids December 17 for 5000 ft. of 3-in. and 8000 ft. of 3½-in. black gas pipe. The Maricopa, Ventura & Los Angeles Pipe Line Company is working on a 140-mile oil line project.

**Cast Iron Pipe.**—Considerable business, especially in gas pipe, is coming from private corporations, but the demand is hardly up to expectations, and the volume of municipal business is much less than was counted on, with only a fair prospect of improvement before the end of the year. A few inquiries are coming out, however, and much delayed municipal business will probably be placed in the spring. Small lots have been ordered by the towns of Pasadena and Long Beach, Cal., and the towns of Imperial and Fullerton are taking figures. The city of Vancouver, B. C., will probably be out for a large tonnage early in the year. Prices per net ton, San Francisco, remain at \$38.50 for 4-in.; \$36.50 for 6- to 10-in.; and \$36 for larger sizes.

**Pig Iron.**—The market has stiffened materially of late, and some good sized orders have been placed, though many melters have covered their requirements for several months to come, and there is a general hesitancy to pay the prices now asked. While castings are still very cheap, the foundry business is fairly active, and the supply of pig iron imported during the fall is by no means excessive. Some spot offerings of English iron are reported at \$25 to \$26 per gross ton, but a lot of No. 1 Jarrow, held for the last two years, was recently sold at \$28 ex warehouse. No. 1 English foundry iron, to arrive, is quoted at a range of \$27.50 to \$30 per gross ton, while Southern foundry iron is quoted at \$24.58 per gross ton for No. 1 and \$24.08 for No. 2. Local melters are better satisfied than formerly with the quality of Southern iron, but some prefer to buy foreign iron owing to the difficulty of getting deliveries from Southern furnaces in periods of special

activity. Many local foundries are using small amounts made by the Noble Electric Steel Company, which is of fine quality and sells on about the same basis as Southern. A small tonnage of iron of various grades was recently imported from India, and is being tested by the foundries. The results have been apparently satisfactory, but the price at present is considered too high. No Chinese iron has been received recently, but shipments may be resumed before long.

**Coke.**—The larger local melters are fairly well covered for the present, and the market is quiet. Wholesale dealers quote Pelton Main and German Syndicate coke at \$14 per gross ton, ex yard. Importers quote English coke, ex ship, to arrive, at \$13.50 to \$14 per gross ton, and German at \$14 to \$14.50.

**Old Material.**—Some of the larger local yards have enough business to clean up fairly well by the end of the year. The various coast rolling mills and steel plants have been liberal buyers of steel melting and wrought iron scrap, and the local rerolling mill is taking its full quota of old rails. Cast iron scrap is getting fairly well cleaned up, as no large lots are coming on the market, and prices are advancing. Dealers offer \$15.50 per net ton, and some melters report purchases of heavy machinery scrap at \$17 to \$18. Other prices are: Steel melting scrap, per gross ton, \$12.50; wrought scrap, per net ton, \$12.50 to \$15; rerolling rails, per net ton, \$11. A 500-ton cargo of miscellaneous scrap has just arrived from the Hawaiian Islands.

The C. W. Pike Company, San Francisco, has taken agencies for the Canton Sheet Steel Company, Canton, Ohio, and the Deforest Sheet & Tinplate Company, Niles, Ohio.

The Waterhouse & Lester Company, steel and heavy hardware merchant, announces that after January 1 its Sacramento branch will be closed and the business handled from the San Francisco office.

The Levin & Sons Iron & Metal Yard has been incorporated in San Francisco, with a capital stock of \$35,000, by J. Levin, J. R. Kelly and W. G. Weiss.

## Germany Feels the Balkan War

BERLIN, November 21, 1912.

It begins to be admitted more freely in trade circles that the war in the Balkans is causing a quieter tone in the iron market. This, however, applies only to bars and such other products as are not controlled by a firm organization; and even in such commodities it is true only of orders for remoter periods of delivery. To state the matter in another form, products that are dependent in part upon dealers are finding a slower market. It is everywhere remarked, on the other hand, that specifications on contracts are coming in normally. That the situation is still regarded as promising is evident from the fact that the Steel Works Union to-day marked up structural shapes, for the first quarter of 1913, 2.50 marks a ton. Recently, too, several German states and certain municipalities renewed their contracts for grooved and light rails at an advance of 3 to 4 marks over previous contracts.

### The Steel Works Union Expresses Confidence

The market survey given out by the Union to-day points out that consumers of semi-manufactured products continue well employed, that calls for delivery are still brisk and that supplies of material are scarce. Business in these products for the first quarter of 1913 was opened at unchanged prices, although there had been a pretty wide demand among the mills that they be advanced 2.50 marks. The statement goes on to say that foreign business in half-rolled material is in a favorable position, particularly in Great Britain, and that the Balkan War has had no substantial effect upon calls for delivery. Business in heavy rails is declared to be very satisfactory, the amount of work in hand being considerably greater than in November, 1911. Further big foreign orders have been taken. Inquiries from foreign markets continue to arrive in good volume, indicating a favorable position abroad. The demand for beams, as is usual at the beginning of winter, has become somewhat quieter, but foreign business remains very good.

### Car Shortage Severely Felt in Coke and Ore

While the shortage of freight cars is felt chiefly by coal companies, it is also becoming a serious problem for iron companies, whether they own their coal mines or are dependent upon other producers. The shortage in the Essen region was about 10,000 cars a day till a week ago, but latterly it has risen to over 14,000 cars.

Furnaces have already been blown out for lack of coke, and the great Hoesch Company reports that after having been compelled to curtail its work it is now in danger of having to shut down altogether.

The ore business feels the effect of the car shortage to a serious degree. Shipments from the Siegen district to Upper Silesia, which were begun about the beginning of the year, have been wholly suspended; and the railroads have not even been able to meet the regular requirements of the Rhenish-Westphalian district. In consequence of this situation stocks of ores have accumulated at the mines to some extent. Sales for the first half of 1913 at advanced prices have been going on briskly for some time. Business in minettes for 1913 is also going on at firm prices. There is a scarcity of the richer grades. Transactions in foreign ores for 1913 have not been so heavy as had been expected; buyers are evidently holding back somewhat owing to high prices, which are in part the result of high ocean freight rates. The price for 50 per cent. Spanish ores delivered on the Ruhr is now 21.50 to 22 marks a ton. Supplies of rich manganese ores are rather short in view of the uncertainty of freight movement in the Dardanelles and prices are rising. Swedish ores are mostly delivered in long contracts, but higher prices must be paid on new orders.

### Pig Iron Active for 1913

Transactions in pig iron for the first half of 1913 have been active since business was opened several weeks ago, and there has also been considerable supplementary ordering for December delivery. There is a considerable demand for 20 per cent. spiegeleisen, with foreign markets taking their normal requirements. Basic (Thomas) iron is in heavier demand than can be met and Luxemburg grades can scarcely be shipped for export as fast as wanted. There is a marked scarcity of hematite grades for prompt delivery; in foundry grades business is active, including foreign orders at good prices. Russia is sending in larger orders. There is a strong demand for scrap, but as the supplies coming upon the market are also large prices have hardly changed, though a firmer tendency is mentioned. Cast scrap has followed the upward movement of pig.

Business in bars for remoter dates is very quiet, dealers holding back in view of political conditions. The upward tendency of prices has evidently come to a standstill; present quotations appear to range between 123 and 125 marks, though some reports mention higher figures. Large amounts of bars are going into the export trade, but here, too, a quieter tone is observed in transactions for remoter dates. Export prices keep up well, namely, 122.50 to 125 marks, f.o.b. seaport, for good German bars of soft steel. South American countries continue to order bars in large amounts.

In bands there is much work in hand. The mills are not able to accommodate orders for the first quarter of 1913 to any considerable extent. Prices are firmly held at 145 to 150 marks. It is mentioned in one report that orders are coming in more slowly of late. The position of cold-rolled bands remains very strong, as previously reported; though home orders are now coming in more slowly, as consumers have covered their requirements for a considerable period ahead. Mills running on strips for tube manufacturers are very heavily employed owing to the active trade in tubes. The tube mills have good foreign orders.

### The Plate Trade Quieter

Heavy plates are somewhat quieter, but orders in hand extend so far ahead that the lighter business for the moment awakens no concern whatever. In medium thicknesses the demand is so heavy that the mills can hardly meet it. The foreign demand for thin plates has fallen off considerably, but the work in hand will last most mills through the March quarter. Home orders are also coming in more slowly, and the last prices are scarcely maintained. It seems now to be well nigh certain that the Kontor in ship plates will break up, owing to the excessive allotments claimed by some works. These concerns as independents would make the selling agency worthless. The matter will be cleared up early in December.

From the hardware trade it is reported that the effects of the war are becoming more perceptible. Export orders are slack and some have been canceled that were placed some time ago. Several concerns that work largely for the export markets have been compelled to dismiss workmen or shorten hours. Locks appear to have felt the war's effects more seriously than other goods.

The movement of the Belgian market has been latterly rather irregular. About 10 days ago a drop of



one shilling in the export price of basic bars was reported and a few days later iron bars and thin plates for export were reduced by the same figure. This week, on the other hand, a Brussels dispatch mentions an advance of various grades of pig iron for the home trade by one franc.

The dividend of the Krupp Company is 12 per cent., which compares with 10 per cent. for last year. Gross earnings were 46,038,000 marks, against 43,100,000 marks.

## British Consumption Still Heavy

European Demands for Steel in Excess  
of Production — British Iron Softer

(By Cable)

MIDDLESBROUGH, ENGLAND, December 4, 1912.

Speculation in pig iron is dull, but the situation is intrinsically strong and buying of hematite continues, with 90s. paid for early delivery. The United States Steel Corporation has informed a big Welsh customer that it cannot complete deliveries before May of semifinished steel under contract expiring December and all of the September specifications are not yet shipped. America is inquiring for billets from the German Steel Works Union, and it is felt that the British are unlikely to get anything.

European demands are far in excess of production and all deliveries are belated. The German Steel Works Union has nothing left for the first quarter and very little for the second, and there are still large inquiries in the market. We quote as follows:

Cleveland pig iron warrants (closing Tuesday), 67s. 1d., against 67s. 8½d. one week ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 67s. 6d., a decline of 9d. in the week.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £6, for January-March delivery.

German sheet bars, f.o.b. Antwerp, 112s. 6d.

German 2-in. billets, f.o.b. Antwerp, 107s., an advance of 2s.

German basic steel bars, f.o.b. Antwerp, £6 6s.

Steel bars, export, f.o.b. Clyde, £8.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7 10s.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yard, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 15s. 3d.

## St. Louis

ST. LOUIS, Mo., December 2, 1912.

**Pig Iron.**—Purchases continued to be of the car-load and 100-ton lot type with a few exceptions, these including a sale of 1200 tons of 50 per cent. ferrosilicon, a 1000-ton sale of basic and several 500-ton lots for special purposes, or immediate needs following the exhaustion of contract allotments. Inquiries now in the market are generally for small lots, but the demand for shipment remains as urgent as at any time in the past.

**Coke.**—Foundry grades are hard to get and the quotation for Connellsville best 72-hour selected is still \$4.50 to \$5 per net ton at oven. Furnace coke is also hard to get and transactions continue from hand to mouth. No buyers are willing to commit themselves for future delivery of foundry coke. By-product coke is selling to some extent and is being quoted on the Connellsville basis.

**Finished Iron and Steel.**—The structural market showed no new features; business continued to flow in with no cessation as to quantity and specifications on contracts were good. Insistence on shipment is more intense if anything. Bars are in active consumption and demand. In standard section steel rails nothing is expected until after the first of the year. Track fastenings have been in increased demand at firm prices on last quotations. Coal mines are buying light rails quite freely. Agricultural and wagon interests are still very active.

**Old Material.**—There has been a softening of decided character and quotations show recessions practically all down the line. Mills using scrap seem to

be well filled up and while it is known that their orders are large and cover them far into the future, they are content to wait awhile before buying further. It is doubtful if the situation will change materially during the next two or three weeks, or until after the holidays. The dealers, however, are fairly satisfied as they are not left with any accumulations in their yards and any recurrence of demand will, therefore, lift prices at once. Relaying rails are the exception to the rule. They are firm, and are still hard to get. The winter period is expected to reduce railroad offerings, thus preventing further recession of consequence. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	\$15.00 to \$15.50
Old steel rails, rerolling	15.00 to 15.50
Old steel rails, less than 3 feet	14.50 to 15.00
Relaying rails, standard section, subject to inspection	24.00 to 25.00
Old car wheels	15.00 to 15.50
Heavy melting steel scrap	14.00 to 14.50
Frogs, switches and guards cut apart	13.50 to 14.00

Per Net Ton.	
Iron fish plates	\$11.50 to \$12.00
Iron car axles	20.00 to 20.50
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	12.00 to 12.50
Railway springs	11.75 to 12.50
Locomotive tires, smooth	12.50 to 13.00
No. 1 dealers forge	9.50 to 10.00
Mixed borings	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 1 boilers cut to sheets and rings	8.00 to 8.50
No. 1 cast scrap	11.50 to 12.00
Stove plate and light cast scrap	9.00 to 9.50
Railroad malleable	11.50 to 12.00
Agricultural malleable	9.50 to 10.00
Pipes and flues	8.00 to 8.50
Railroad sheet and tank scrap	7.50 to 8.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	8.50 to 9.00
Bundled sheet scrap	7.50 to 8.00

## New York

NEW YORK, December 4, 1912.

**Pig Iron.**—The market has been quieter than in several weeks. For the most part the orders booked have been of a filling-in character, as illustrated in the case of one large railroad supply interest, which is placing lots of 200 to 500 tons for plants in different parts of the country. In the Hudson Valley some business is pending, the inquiry in one case being for the third quarter of 1913. Only occasionally, however, does a consumer care to make commitments so far ahead. A soil pipe interest is still in the market for 1500 to 2000 tons. Buffalo furnaces have little iron to sell for the first half of next year, and their quotation beyond July 1 is around \$18 for No. 2X. In New England the chief pending business is in basic iron, for which one steel plant will probably close for 5000 to 6000 tons. Virginia iron has figured to but a small extent in recent business in the New York district, as well as in New England. Offsetting to some extent the withdrawal of one Virginia producer from the market on No. 2X is the blowing in of an additional furnace of another interest. Eastern Pennsylvania furnaces are holding generally to the prices recently announced and the diminished inquiry for pig iron has not been attended by indications of weakness. We quote as follows for Northern iron at tidewater: No. 1 foundry, \$18.50 to \$18.75; No. 2X, \$18.25 to \$18.50; No. 2 plain, \$17.75 to \$18. Southern iron is quoted at \$18.75 to \$19 for No. 1 foundry and \$18.50 to \$18.75 for No. 2.

**Structural Material.**—The amount of business being placed is not particularly large, but there is considerable being offered for figuring, in spite of a season of expected dullness, and much business of small proportions is dependent on early shipment. The signs are that specifications on contracts in December will be large, and with an occasional questioning of the permanence of the present high scale of operations, the main consideration of the sales offices continues to be the congested situation of the mills. The relatively large work lately closed includes the following: 900 tons for the Fifth National Bank building, Lexington, Ky., and 600 tons for the Marquand apartment, New York, to the Noelke-Richards Iron Works; 550 tons, Harvard Club, Boston, to the New England Structural Company; 325 tons for the Philadelphia & Reading for the Port Richmond branch, to the McClintic-Marshall Construction Company; 550 tons for the extension of the Marion power house, Jersey City, to the Lackawanna Bridge Company; 2500 tons bridge work for the New York Central, of which the American Bridge Company took 225 tons, and 250 tons for 21 spans for the Atlantic Coast Line. Among new projects and

projects revived may be mentioned the following: Sections F and G of the Brooklyn Institute of Arts and Sciences; 100 x 120-ft. addition to the machine shop of the Watson-Stillman Company at Aldene, N. J.; about 3100 tons for a 20-story store and loft building, Madison avenue and Thirtieth street, for Charles Kaye; building for Greenpoint hospital, Albert Winternitz, contractor; building for the Peoples National Bank, Lynchburg, Va.; South Side schoolhouse, Newark, N. J.; 18-story building, 130 East Fifteenth street, for the Consolidated Gas Company, requiring perhaps 5000 to 6000 tons of steel; warehouse for the McKeon Realty Company, Eleventh avenue and Sixteenth and Seventeenth streets; Hospital for Deformities and Joint Diseases, East 123d street; 12-story apartment, 929 Park avenue, for the Park Central Building Company, and 12-story office building, Beaver and New streets, for Brody, Adler and Koch. We quote plain material at 1.66c. to 1.86c., New York, for mill shipment, according to delivery, and 2.15c. from store.

**Steel Plates.**—There is practically no new inquiry in the market for railroad cars and little car buying has been made public. Railroads generally are still regarded as disposed to buy with injunctions of secrecy, but it is believed that early future business aggregates at least 50,000 cars. The week's closures include: 3000 cars for the Pittsburgh & Lake Erie, 1000 each to the American Car & Foundry, the Pressed Steel Car and the Standard Steel Car Companies; 40 12,000-gal. tank cars for the Northern Pacific to the American Car & Foundry Company, and 100 gondola and 100 hopper cars for the Westmoreland Coal Company to the Cambria Steel Company. There are indications that subsidiaries of the United States Steel Corporation have had to go into the open market for forms of finished product, a step further than buying semi-finished steel. Sheared plates are 1.66c. to 1.76c., New York, according to delivery, and universal plates are usually \$1 per ton higher.

**Iron and Steel Bars.**—While still strong, bar iron does not seem to have held 1.60c. at mill, and 1.55c. has been done on somewhat moderate purchases. Specifications against contracts are heavy, and there are still no signs that much duplicate buying has been done. It is believed that the buying of this character has been very small in comparison with the total volumes moving. Steel bars are nominally 1.40c., Pittsburgh, or 1.56c. minimum, New York, mill shipments, and from store 2c. Refined iron bars are 1.65c. to 1.75c., New York, and from store, 2c.

**Cast Iron Pipe.**—Considerable improvement has developed in the cast iron pipe trade. Private water and gas companies are again buying quite freely, some for immediate delivery and others for spring shipment. Rather heavy inquiries are in the market from this class of consumers. No new public lettings are reported in this section of the country. Quotations on carload lots of 6 ins. range from \$24.50 to \$26 per net ton at tidewater, according to the condition of makers' order books.

**Old Material.**—With the exception of the foundry trade, the market is not only quiet but conditions are such as to cause considerable uneasiness to holders of old material. The steel companies in eastern Pennsylvania continue to be well stocked, and embargoes are threatened at more works. Some of the largest consumers of steel scrap are imperatively ordering the discontinuance of shipments. The bar iron mills also appear to be well supplied and are doing little in the market. Quotations on steel scrap and on rolling mill stock are therefore weak, and dealers are somewhat at sea regarding quotations. Opposite conditions prevail with regard to cast scrap, which is in good demand and firmly held. Some of the larger foundries having contracts with dealers are urging shipments. Dealers' quotations are as follows per gross ton, New York and vicinity:

Old girder and T rails for melting	\$12.00 to \$12.50
Heavy melting steel scrap	12.00 to 12.50
Relaying rails	22.50 to 23.00
Rerolling rails	14.00 to 14.50
Iron car axles	24.00 to 25.00
Old steel car axles	16.00 to 16.50
No. 1 railroad wrought	13.75 to 14.25
Wrought iron track scrap	13.00 to 13.50
No. 1 yard wrought, long	12.50 to 13.00
No. 1 yard wrought, short	12.00 to 12.50
Light iron	5.50 to 6.00
Cast borings	8.50 to 9.00
Wrought turnings	9.00 to 9.50
Wrought pipe	11.00 to 11.50
Old car wheels	15.00 to 16.00
No. 1 heavy cast, broken up	12.00 to 12.50
Stove plate	9.75 to 10.00
Locomotive grate bars	9.00 to 9.50
Malleable cast	11.50 to 12.00

**Ferroalloys.**—The shortage in ferromanganese, not only for spot but also for deliveries through the first half of next year, has caused prices to stiffen and the wide range of quotations indicates a still stronger market. In fact cabled information giving a rise in price is momentarily expected. For 80 per cent. ferromanganese, first half delivery, \$62.50 to \$65 and higher, Baltimore, is asked, while for the last half quotations are from \$61 to \$65. Spot is nominal around \$75. There has been considerable activity in last half business, and in the last few days between 1000 and 2000 tons has been placed at \$61, Baltimore. Ferrosilicon is unchanged at \$75 for carloads of 50 per cent.; \$74 for 100 tons, and \$73 for 600 tons or over. Since the Steel Corporation closed for its heavy 1913 requirements there is not much large business in view, although there are inquiries now but for several carloads for early shipment.

## Metal Market

NEW YORK, December 4, 1912.

### The Week's Prices

		Copper, New York		Tin, New York		Lead, New York		Spelter, New York	
		Nov.	Lake.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
29	.....	17.75	17.50	49.45	4.50	4.35	4.35	7.50	7.35
30	.....	17.75	17.50	.....	4.50	4.35	4.35	7.50	7.35
Dec.									
2	.....	17.75	17.50	50.00	4.45	4.30	4.35	7.50	7.35
3	.....	17.75	17.50	49.65	4.35	4.20	4.20	7.45	7.30
4	.....	17.75	17.50	49.30	4.35	4.20	4.20	7.40	7.25

Copper is quiet and lower. Tin has been inactive and prices have declined. Lead is again down in price. Spelter is weaker. Antimony is unsettled.

### New York

**Copper.**—Quiet conditions have continued, there being very little buying on either domestic or foreign account. Lake is firmly held at 17.75c. by the larger interests although some could probably be found at shaded prices. Electrolytic is held nominally by the large producers at 17.75c. delivered, cash, 30 days, but offerings of good sized lots have been made at prices equal to 17.50c., cash, New York, and it is even said that a price five points lower might be taken, but buyers have not made themselves felt. The total exports of copper for the month of November were 19,146 tons, the smallest of any corresponding time in two years. Because of these figures it is expected that the Copper Producers' report for November will show a large increase in surplus stocks. Consumption, while still very good, is gradually dropping back to a normal basis. The exports this month have been 2040 tons. The price in London to-day is £78 8s. 9d. for spot and £77 6s. 3d. for futures.

**Copper Averages.**—The Waterbury average for the month of November was 17.75c. The average New York price of Lake copper for November, based on *The Iron Age* quotations, was 17.70c. and of electrolytic, 17.55c.

**Pig Tin.**—The recent activity in pig tin has subsided almost completely. Last Friday and Saturday there was very little doing and Monday and Tuesday of this week even less. What tendency there was to buy in the early part of this week seemed to have been effectually headed off by the higher price of Monday when the metal touched 50c. again. To-day tin is off £1 10s. in London, with a corresponding reduction here, which may excite active buying too late to be included in this report. The higher price in London on Monday was due in part to the monthly statistics which were regarded as favorable for continued high prices. In November all estimates as to the amount of tin delivered into domestic consumption were exceeded, American consumers having taken 4300 tons, leaving a stock on hand December 1 of 1559 tons. The price of tin in New York to-day is 49.30c. and the London price for spot is £225 15s. and of futures £224 15s. The arrivals were 300 tons this month and there is afloat 1801 tons.

**Tin Plates.**—Prices and conditions are unchanged, the jobbing demand continuing to be very fair which is in large part due to the open season permitting much outside work.

**Lead.**—The unsettled condition of the market referred to a week ago culminated yesterday in a reduction of \$3 per ton, or 15 points, to 4.35c., New York, by the American Smelting & Refining Company. Otherwise conditions are unchanged, as the market is dull and plenty of lead is offered. It is taken for granted that the independent producers will follow the cut. The St. Louis price is 4.20c.



**Spelter.**—This metal is dull, inactive and has developed a weakness in price despite predictions that the trend would be the other way. One very probable influence leading to the reduction is the possibility of the importation of spelter at a competing price. The price in New York is 7.40c. and in St. Louis 7.25c.

**Antimony.**—The market has been more or less upset through the offering of resale lots at prices lower than the import costs, which are unchanged. Quotations are 10.25c. for Cookson's, 9.50c. to 9.75c. for Hallitt's and 9.25c. for Chinese and Hungarian grades.

**Old Metals.**—Quiet conditions continue. Dealers' selling prices are nominally unchanged as follows:

	Cents per lb.
Copper, heavy and crucible.....	17.00 to 17.25
Copper, heavy and wire.....	16.50 to 16.75
Copper, light and bottoms.....	15.00 to 15.25
Brass, heavy.....	10.50 to 10.75
Brass, light.....	8.50 to 8.75
Heavy machine composition.....	14.00 to 14.25
Clean brass turnings.....	9.75 to 10.00
Composition turnings.....	12.50 to 13.00
Lead, heavy.....	4.75
Lead, tea.....	4.50
Zinc, scrap.....	6.25

#### Chicago

DECEMBER 3.—The metal market has been almost lifeless. Tin quotations appear somewhat stronger, but practically all other prices are unchanged. We quote as follows: Casting copper, 17.62½c.; Lake, 17.75c. to 18c., in carloads for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 51c.; small lots, 53c.; lead, desilverized, 4.45c. for 50-ton lots; corrodng, 4.70c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 7.40c. to 7.50c.; Cookson's antimony, 11.25c., and other grades, 10.50c. in small lots; sheet zinc is \$9. f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 15.50c.; copper bottoms, 14c.; copper clips, 15c.; red brass, 12.75c.; yellow brass, 10c.; lead pipe, 4c.; zinc, 5.50c.; pewter, No. 1, 33c.; tinfoil, 30c.; block tin pipe, 45c.

#### St. Louis

DECEMBER 2.—The week has been quiet with some changes in price, chiefly in the downward direction, but not markedly so. Lead was quotable to-day at 4.32½c. to 4.35c.; spelter, 7.25c. to 7.30c.; Lake copper, 17.97½c. to 18.22½c.; electrolytic copper, 17.87½c. to 18.12½c.; tin, 49.50c. to 49.85c.; antimony, Cookson's, 10.85c. In the Joplin ore market zinc ore, especially in the second grades, has been in stronger demand. The top price for choice lots was \$61 per ton, but the range on 60 per cent. metal assay basis was \$56 to \$58.50, which is materially higher than for some time. The market was brisk and the buyers came in unusually early in their search for ore. Calamine was strong, selling for \$29 to \$33 for 40 per cent. and reaching \$38 for the choicest lots. Lead ore declined \$2 per ton, being sold at \$54, with the demand weak and many producers declining to sell at the offering. On miscellaneous scrap metals we quote as follows: Light brass, 6.50c.; heavy brass and light copper, 10.50c.; heavy copper and copper wire, 13c.; pewter, 25c.; tinfoil, 32c.; zinc, 4.50c.; lead, 4c.; tea lead, 3c.

### The Syracuse Iron Mine—A Correction

The Iron Age regrets the publication in its issue of November 21, page 1204, of an article from one of its correspondents relating to the Syracuse mine on the Mesaba range. Some of the statements contained in the article gave a wrong impression, including one to the effect that Pickands, Mather & Co. had "finally abandoned" the property. We are informed that neither \$1,000,000 nor anything approaching that amount was spent in the exploration work. After stopping mining operations in September, 1910, Pickands, Mather & Co. had an opportunity of selling their lease and it was thereupon disposed of at a satisfactory figure.

The Alberger Pump & Condenser Company, 140 Cedar street, New York, announces that it now possesses the exclusive right to manufacture and sell the Hammond meter. This meter has been largely used in power stations for keeping an accurate record of boiler feed. It is also adaptable for measuring other fluids. The Alberger Company describes it as ideal for use in modern industrial plants.

## Iron and Industrial Stocks

NEW YORK, December 4, 1912.

The stock market has been dull but generally firm. The decision of the United States Supreme Court ordering the dissolution of the merger of the Union Pacific and Southern Pacific railroad companies caused comparatively little excitement among holders of stocks. A few years ago such a decision would have almost precipitated a panic. The United States Steel stocks showed some recession, but not what might have been expected. General Electric stock has advanced with the approach of the date for the distribution of the 30 per cent. stock dividend. The range of prices on active iron and industrial stocks, from Wednesday of last week to Tuesday of this week, was as follows:

Bald. Loco., com....	54¾-55½	Pressed Steel, pref.....	101½
Bald. Loco., pref.....	107	Railway Spring, com. 36¾-36½	
Beth. Steel, com....	38¾-41½	Railway Spring, pref.....	101
Beth. Steel, pref.....	68-71	Republic, com.....	27½-28¾
Can, com.....	36¾-41¾	Republic, pref.....	83¾-90
Can, pref.....	122-124½	Sloss, com.....	49
Car & Fdry., com....	59-59¾	Sloss, pref.....	96-97
Car & Fdry., pref.....	119	Pipe, pref.....	59¾-60¾
Steel Foundries.....	36-38	U. S. Steel, com....	72½-75½
Colorado Fuel.....	35-36	U. S. Steel, pref.....	110½-112
General Electric.....	184½-187¾	Westinghouse Elec....	81½-83¾
Gr. N. Ore Cert.....	45-46½	Va. I. C. & Coke.....	60
Int. Harvester, com. 120-120½		Am. Ship, com.....	57
Int. Harvester, pref. 114½-115		Am. Ship, pref.....	104
Int. Pump, com....	24-25	Chic. Pneu. Tool.....	53-53½
Int. Pump, pref.....	79½	Cambria Steel.....	48¾-49½
Lackawanna Steel.....	49½-50	Lake Sup. Corp.....	30½-31½
Locomotive, com....	45¼-46½	Warwick.....	10½
Locomotive, pref....	106¾-107½	Crucible Steel, com. 16-16½	
Nat. En. & St., com. 19¾-20		Crucible Steel, pref. 96-96½	
Pressed Steel, com. 36¾-37		Harb. Wk. Ref., com. 50½-51	

Commencing January 1, the Wheeling Steel & Iron Company, Wheeling, W. Va., expects to put its stock on a regular 10 per cent. dividend basis, 2½ per cent. to be paid on the first of each quarter. For some years the company has paid 2 per cent. quarterly, and for the past three years has paid an additional dividend of 2 per cent. at the end of each year. The dividends, however, were not paid at a fixed time.

#### Dividends Declared

The Railway Steel Spring Company, regular quarterly, 1¼ per cent. on the preferred stock, payable December 20.

The Baldwin Locomotive Works, semi-annual, 1 per cent. on the common and 3½ per cent. on the preferred stock, both payable January 1.

The Safety Car Heating & Lighting Company, regular quarterly, 2 per cent., and extra, 1 per cent., payable December 23.

The American Car & Foundry Company, regular quarterly, 1¼ per cent. on the preferred and ½ of 1 per cent. on the common stock, payable January 1.

## Personal

C. H. Morse, Sr., president, and W. E. Miller, vice-president, of Fairbanks, Morse & Co., are making a tour of inspection of the Pacific coast offices.

Herbert P. Howell, credit manager of the Carnegie Steel Company, Pittsburgh, has resigned to become one of the vice-presidents of the National Bank of Commerce of New York City. He entered the employ of the Carnegie Steel Company in 1899 as a clerk and was steadily advanced.

G. M. Pott of St. Louis has been made master mechanic of the Mahoning works of the Republic Iron & Steel Company at Youngstown, Ohio, succeeding George C. Ashworth.

Among those slightly injured in the wreck of a Pennsylvania Railroad train near Frazer, Pa., November 20, were David G. Kerr of the United States Steel Corporation, his mother and sister, and W. U. Follansbee of the Follansbee Brothers Company, Pittsburgh.

W. A. Keirn, publicity manager of the Mesta Machine Company, Pittsburgh, has been re-elected treasurer of the Pittsburgh Publicity Association. J. C. McQuiston, manager of the Westinghouse Department of Publicity, the retiring president of the organization, has been presented with a hand-bag, containing a silver mounted traveling set, in recognition of the work he performed for the association.

John G. Berquist, works manager for the Universal Portland Cement Company, Chicago, has resigned from

that position, but will maintain his connection with the company as consulting engineer.

Leonard Wesson, formerly superintendent of the South Chicago plant of the Universal Portland Cement Company, has been made assistant to President Hagar with respect to appropriations for operation and new construction in particular. He is succeeded at the plant by Nels Nelson. Mr. Wesson will be located at the general offices of the company in Chicago.

A. G. Warren, of the J. W. Paxson Company, Philadelphia, Pa., will address the Associated Foundry Foremen of Philadelphia, Pa., December 11, on "Sand Blast Apparatus for Cleaning Castings."

John Daker, Jr., formerly with Hickman, Williams & Co., has joined the sales force of Eaton, Rhodes & Co., Cincinnati, pig iron merchants.

Samuel S. McCormick and Edwin L. Parry, formerly with the C. C. Knight Company, Philadelphia, Pa., now in liquidation, have formed a partnership under the name of McCormick & Barry and will engage in the iron and steel business, having acquired a portion of the old Knight premises at the southwest corner of Sixteenth and Callowhill streets. Mr. McCormick has been associated with C. C. Knight & Co., and later the C. C. Knight Company, for 31 years, while Mr. Parry has been connected with the business for the past 11 years.

James W. Galvin, assistant superintendent of the open hearth department of the Inland Steel Company, Indiana Harbor, Ind., has resigned to become superintendent of the open hearth department of the new plant of the Alton Steel Company, Alton, Ill.

James Morton has returned to New York after completing his eighth trip around the world as the representative of a number of American manufacturers of machinery and hardware. Mr. Morton makes Australia his principal field, though in the making of sales he also travels in South America, Africa, New Zealand, Japan, China and India. He returned to the United States via Yokohama.

The Independent Pneumatic Tool Company, Thor Building, Chicago, has appointed Walter A. Johnson manager of its branch office at Atlanta, Ga., to succeed John J. Keefe, deceased. Mr. Johnson has been connected with the Independent Company's Pittsburgh office for several years, and is well equipped for his new duties.

Cyril J. Atkinson, inventor and patentee of the Atkinson gas producer and a number of special devices pertaining to gas producers, has severed his connection with the Dornfeld-Kunert Company, Watertown, Wis. His services and the use of all his patents have been secured by Fairbanks, Morse & Co., Chicago, and a number of his patents will be incorporated in the Fairbanks-Morse gas producers at once.

### The Hess-Bright Manufacturing Company's New President

The recent purchase by the Deutsche Waffen und Munitions Fabriken (D.W.F.) of the interest formerly held by Henry Hess in the Hess-Bright Mfg. Company, Philadelphia, Pa., and Mr. Hess's consequent retirement, have awakened interest in the personality of the former vice-president and treasurer, Fred. E. Bright, who has assumed the presidency of the company and in whose hands the ownership control remains. Mr. Bright was associate inventor and designed of a linotype (typograph system) which he took to Europe in 1893, personally directing, during a period of years, its establishment with Ludwig Loewe & Co., Berlin, Germany (parent company of the D.W.F.), it being now one of their most profitable and successful branches. Thus began an intimate association between Loewe & Co. and Mr. Bright, which has continued during the organization of the D.W.F. and the founding and development by Mr. Hess and himself of the Hess-Bright Mfg. Company, which latter company controls the patents of the D.W.F. in this country together with many others. The manufacture of ball bearings is by no means a new subject to Mr. Bright, for, besides being closely associated with Mr. Hess in the development of the Hess-Bright Company and its specialties, he manufactured ball bearings of other forms as early as 1890.

### Obituary

JOHN J. KEEFE, Southern representative of the Independent Pneumatic Tool Company, Chicago, at Atlanta, Ga., died November 20 from an attack of typhoid fever, aged 46 years. Interment was made at Bloomington, Ill. He was born in Susquehanna, Pa., and his entire business life was associated with the railroads, having served for a number of years in the mechanical department of various roads until about 10 years ago, when he entered the railroad supply field, continuing in that line up to his death. He leaves a widow and one son.

GEORGE B. FINDLAY, aged 46 years, and JOHN E. COLLINS, aged 30 years, officials of the West Virginia-Pittsburgh Coal Company, were killed in the Pennsylvania Railroad wreck near Frazer, Pa., November 29.

### Pittsburgh and Vicinity Business Notes

The Riter-Conley Mfg. Company, Pittsburgh, has received a contract for steel pipe and penstocks for the Erie Construction Company, Altmar, N. Y., for the Salmon River power development, consisting of 1200 ft. of pipe 11 ft. 6 in. in diameter, 260 ft. of pipe 12 ft. in diameter, and two penstocks, each 357 ft. long, 8 ft. in diameter, requiring about 1200 tons of plates.

The regular monthly meeting of the Pittsburgh Foundrymen's Association was held in the Fort Pitt Hotel on the evening of December 2, preceded by a dinner. The meeting was addressed by Commander J. K. Robinson, United States Navy, on "The Various Functions of a Tender to the Torpedo Flotilla."

The Allegheny Foundry & Machine Company, Glessner, Allegheny County, Pa., has been organized with a capital stock of \$30,000 to carry on a general foundry and machine business.

T. E. Bilquist, Stevenson Building, Pittsburgh, is taking bids on revised plans for the Elizabeth Steele Magee Hospital building in that city, which will require approximately 600 tons of structural steel. Estimates are also being taken on three 125-hp. return tubular boilers, two 100-kw. engine and generator sets and one 50-kw. engine and generator set for the power plant of the hospital.

The Mesta Machine Company, Pittsburgh, is making some improvements to its plant at West Homestead, Pa. A three-story addition, 41 x 53 ft., connecting the administration building with the main plant, and an attractive waiting room for the convenience of employees using electric cars are being built. An overhead bridge, 12 ft. wide, will extend from the station to the center of the new addition, making it unnecessary for pedestrians to cross half a dozen tracks of the Pennsylvania Railroad, as at present. It is also proposed to enlarge the drawing rooms and thus gain additional space for the administrative offices. A large reception room will be provided on the second floor of the main office building directly opposite the private office of the superintendent.

### Reported Iron Ore Discovery in Mexico

CHIHUAHUA, MEXICO, November 30, 1912.—Paul Guinther and Henry Guinther, well known mining men of Santa Rosalia, state of Chihuahua, have discovered what they claim is a very large iron ore deposit. They have acquired title from the government to more than 3000 acres of land on which the ore is found. The property is situated 60 miles east of Santa Rosalia in the Cerro de la Cruzas section of the Camargo district. Coal has been found; it is claimed, in nearby districts. There is talk of an iron and steel plant, but this enterprise will not be started until the proposed railroad between Chihuahua and Monclova, a distance of about 400 miles, is constructed, or at least until the division that is projected to run within three miles of the iron ore deposits is built. Paul Guinther is connected with French capitalists in mine ownership in the state of Chihuahua and also in the smelter at Santa Rosalia.

The Andrews & Hitchcock Iron Company will start up its second furnace at Hubbard, Ohio, early this month on foundry iron. It has been out for repairs.



## The Mechanical Engineers' Meeting

### President Humphreys Discusses the Young Engineer and His Employer

The thirty-third annual meeting of the American Society of Mechanical Engineers was opened Tuesday evening, December 3, in the Engineering Societies Building, New York. Dr. Alexander C. Humphreys, president Stevens Institute of Technology, Hoboken, retiring president, delivered his annual address; the report of the tellers of election for officers for the ensuing year was read; Dr. W. F. M. Goss, dean of the college of engineering, University of Illinois, the president-elect, was introduced, and a reception was held in the society's rooms following the formal portion of the programme.

### Lengthening the College Course

Dr. Humphreys discoursed on "The Present Opportunities and Consequent Responsibilities of the Engineer" and naturally dealt with present day educational problems. He said in part: "Of late years we hear much to the effect that by reason of the rapid strides made and being made in engineering science, the courses in our colleges of engineering should be extended from four years to five, six and even seven years. Will five, six, seven, ten or even twenty years be sufficient?" My answer is in the negative. In four years the college of engineering should be able to teach its students, if they have the natural qualifications and have been soundly prepared, how to learn by themselves and so how to profit effectively by the teachings of experience. Those who employ young engineers complain that too many of them are at first more or less disqualified for practical work by having too high an appreciation of, and too great a reliance upon, their college training? I am arguing in favor of a proper balance between the teaching of the college and the teaching of the school of experience; that is, a proper balance between theory and practice. The engineer graduate must be a commercial engineer in the sense that he should regard the money for the investment of which he is more or less responsible as a sacred trust."

### Responsibility of Employers

"The young graduate should not be left without guidance in the school of experience," Dr. Humphreys continued. "Too often the cadet engineer will be difficult to teach and direct because of his unreadiness to believe that he needs this practical experience. Too often he is unwilling to get down to the long hours, dirt and drudgery which may be required to win this practical experience."

"In the treatment of the cadet engineer there rests upon the employer a grave responsibility. Many a young fellow has been unfairly treated because through ignorance, indifference or stupidity the one in authority has expected more than could in reason be demanded. Some employers, not technical graduates themselves, exaggerate the immediate results to be obtained from a college training. Others, college graduates themselves, forget how little they knew of practical things when they graduated, and they think they are comparing the ignorance of the cadet with what they knew when they graduated; but really they are comparing with what they know now after ten, twenty or thirty years of practical experience."

### Exaggerated Right of Free Speech

"It is with deep regret that I express the belief that college professors, especially professors of economics, and ministers of the gospel have frequently been offenders in this regard. [Hastily considered reform movements.] I believe that certain professors are being retained in their chairs who should be displaced. Especially in the case of universities this may be due to a tendency on the part of president and trustees to exaggerate the right of free speech. Certainly a professor in a state university, to say nothing of the endowed university, should not be permitted to teach doctrines subversive of law and order and the rights of the individual and property under the constitution. If these men cannot be controlled by those to whom they are immediately responsible, they should be controlled by those who control the universities."

"Is it not of the first importance that our public school system should be kept free from teachings which are dangerous to our commonwealth? Should not the

system go farther and exercise a positive influence for sane thinking upon the children under its influence during the most impressionable period of their lives? Not only should these pupils be taught directly respect for the rights of others and respect for constitutional government, but above all the aims and methods should be so amended that the thought constantly kept in the minds of teachers and pupils shall be that the pupils are being trained to become self-supporting and so self-respecting units of the body politic. This implies that these boys and girls shall be taught, shall have pressed home upon them constantly, directly and indirectly, that labor of the hands as well as of the brain, if conscientiously performed, is honorable."

### Strength of Engineering Societies

Dr. Humphreys brought out that in membership the society has made a net increase from 4007 to 4350, not counting the affiliates of the gas power section, which shows a net decrease of 8, and the student affiliates which show an increase of from 635 to 722. Since Past-President Jesse M. Smith made his presidential address in 1909, the membership of the four national societies, generally considered together, civil, mining, mechanical and electrical, has increased from 19,000 to 22,800. The many other engineering societies, specialized and local, would, he thought, bring the combined membership up to not less than 50,000.

The officers elected are as follows: President, W. F. M. Goss, University of Illinois, Urbana, Ill.; vice-presidents—James Hartness, president Jones & Lamson Machine Company, Springfield, Vt.; I. E. Moulthrop, mechanical engineer, Edison Electric Illuminating Company, Boston; H. G. Stott, superintendent of motive power, Interborough Rapid Transit Company, New York; managers—W. B. Jackson, D. C. & Wm. B. Jackson, Chicago; Henry M. Leland, general manager Cadillac Motor Car Company, Detroit; Alfred Noble, New York; treasurer, Wm. H. Wiley, New York.

## Customs Decisions

### Metal Paint Kegs

The Board of United States General Appraisers has sustained a contention raised by DeRoses & Co., A. Mayol & Co. and the Successors of De Suau, regarding the classification of round metal kegs containing white zinc paint. The collector at San Juan, Porto Rico, held that the containers were unusual coverings and exacted duty at the rate of 30 per cent. ad valorem under paragraph 151 of the tariff act. The importers claimed the kegs to be the usual coverings and therefore free of duty. Judge Fischer says that the claim is well taken and must be sustained.

### Steel Washers

The board granted lower duty on lock washers of steel imported by J. Friedenberg and the Szel Import & Export Company. They were returned for duty at 45 per cent. as "manufactures of steel not specially provided for." The board sustained the claim for duty under paragraph 162 at  $\frac{3}{4}$  of 1 cent per lb. as "washers."

**Keystone Bronze Company Expanding.**—W. D. Berry, manager of the New Brighton works of the Keystone Bronze Company, has recently been appointed general superintendent of both the Pittsburgh and New Brighton plants. He has just completed some extensive improvements at the New Brighton works, adding about 2500 sq. ft. of floor space. This will give employment to almost double the present number of employees and increase the product to a total of about 600,000 lb. per month. Mr. Berry also expects in the very near future to make extensive improvements at the Pittsburgh works. The Keystone Bronze Company will then be in position to turn out about 1,000,000 lb. of copper, bronze and brass castings per month. The main office of the Keystone Bronze Company is on Thirty-ninth street, Pittsburgh, Pa.

The Cameron-Schroth Company, Chicago, announces its incorporation in connection with its appointment as selling agent for the line of heating boilers and radiators manufactured by the Richmond Radiator Company, successor to the McCrum-Howell Company.

# Melting Iron in the Cupola Furnace\*

## The Rationale of Combustion— Proper Relation of Fuel and Metal Charges—Oxidized Iron

BY RICHARD MOLDENKE.

The very high temperatures required to melt iron and steel in the cupola, and have the metal sufficiently overheated for casting purposes, render it inadvisable to use water jackets in the construction of the furnace. It is always possible to patch up the lining at the melting zone between daily heats. The remainder of the lining is seldom affected enough by abrasion and chemical action to require replacement oftener than once in nine months.

### Rationale of Cupola Combustion

The cupola is practically a shell of steel lined with a refractory material of the proper kind, and provided with a set of tuyeres to allow air to be driven into the fuel and the charges to be melted. It should have the same diameter throughout, as there is no reduction of ore and consequent change in bulk of material to hold. The tuyeres are to be of an almost continuous type, as it is important to keep the belt of maximum temperature above them (as indicated on the lining) a practically level one. The tuyeres are placed at a point such that allowing for slagging off below them, there is sufficient room to hold the required quantity of molten iron.

In cupola melting it is necessary to burn the fuel as completely as possible, in order to attain the maximum available temperature. That is to say, the carbon of the coke or anthracite must be converted to carbon-dioxide with as little subsequent change to carbon monoxide, by taking up extra carbon from the incandescent fuel, as may be possible. If this desirable condition is effected at the point where the metal charge has been placed, melting under the most favorable conditions ensues. The molten iron is superheated properly, and the chances of oxidation in melting are reduced to a minimum.

It follows from the above that in order to get the conversion of the fuel into the maximum amount of carbon dioxide, not only must the bed stop at the point where this is produced and no more fuel allowed over it, but the proportion of air blown into the cupola and the diameter of the cupola must stand in some fixed relation. It is well, therefore, to study the *rationale* of the process of combustion which takes place in a cupola. Let us suppose that a given cupola has had the bed charged and well burned through; the first metal charge has been put on, and then the succeeding intermediate charge of coke, which is intended only to replace that portion of the bed burned away in melting the first metal charge. The second metal charge is then put on, then coke, then metal, and so on. It is desired to start up melting. The blast is put on, and this is what happens: As the air enters through the tuyeres into the fuel, every molecule of oxygen that touches the incandescent fuel picks up enough carbon to make a molecule of carbon dioxide, which travels along upward through the incandescent bed. Now some of the molecules of this carbon dioxide must naturally be changed to other molecules of carbon monoxide by their contact with more incandescent coke, but as there is a lot of free oxygen present, not to speak of the nitrogen molecules in great abundance, which serve to protect the finished  $\text{CO}_2$  from becoming  $\text{CO}$ , it would take some time and space to travel through to change the bulk of the  $\text{CO}_2$  to  $\text{CO}$ . As a matter of fact the maximum proportion of  $\text{CO}_2$  under ordinary conditions is reached at 18 to 24 in. above the tuyeres, the bed being sufficiently thick to allow this. If more incandescent fuel is above this (as would be the case in producer gas practice) then the change from  $\text{CO}_2$  to  $\text{CO}$  is rapid, and the poor melting results are quickly noticeable.

### Cupola Work of the Bureau of Mines

While the above described process is going on it will be seen that it is quite easy for some free oxygen to reach a considerable distance up into the charge before being used

up in the combustion. In fact, tests on this point by the Bureau of Mines have shown conclusively that there is no place in the cupola absolutely free from uncombined oxygen. It was further found that a lot of the air practically escaped unchanged along the lining, where it is just in the right place to become oxidized as it gets into the melting zone.

A further interesting point proved by the investigations of the Bureau of Mines is that there is a central cone in the fuel bed of the cupola above the tuyeres in which there is a formation of  $\text{CO}$  only, showing that no combustion goes on there, which indicates that as the air is blown into the cupola it curves upward, and some of it does not reach the center directly opposite the tuyeres. The smaller the amount of air going into the same diameter cupola the higher this cone will naturally be, and if it should extend beyond the original height of the bed (after melting for some time) by catching accumulations from the subsequent coke charges, there will be a diversion of the metal charges outward from the center as they descend, and the melting done in the cupola will be considerably less than the normal amount, besides forcing the cupola to melt in a very uneven manner. On the other hand the more air blown into the same diameter cupola, the shorter becomes this cone, and it disappears altogether when the air is forced straight through the bed. This is about the ideal condition, and any further forcing of the air by using larger quantities will unduly increase the melting capacity of the cupola, compel the raising of the coke bed, be apt to start channels in it which will conduct all the air through a portion of the bed only, and will consequently oxidize a lot of iron and be generally unsatisfactory.

The above somewhat involved explanation shows why the amount of air blown into a cupola should bear a certain relation to the diameter of the furnace. Practice is the best guide to this. For instance, the ordinary cupola with a diameter of 54 in. inside the lining takes a little less than 30,000 cu. ft. of air to melt a ton of iron. Under the best conditions of practice this cupola has been found to give 10 tons an hour; hence we must provide 300,000 cu. ft. of air to go into that cupola and see that it really goes in. It is possible to get good results with less air, but then the melting rate drops and this is bad foundry economy. On the other hand, it is possible to get 11 or even 12 tons an hour from the cupola; but this means blowing in the corresponding amount of air with consequent chances of bad working.

There is therefore a safe rate of melting for each diameter of cupola, and this is given by the catalogues of all makers, as taken from experience. If a given cupola does not perform in accordance with this rate and the amount of air blown in has been found to be the correct one—allowing 30,000 cu. ft. per ton to be melted, then the trouble must be looked for elsewhere.

### Height of Bed and Temperature of Iron

Taking up next the question of cupola temperature: As the blast goes through the fuel bed the gases become hotter and hotter up to the point of maximum proportion of  $\text{CO}_2$ , and this may be about 3000 deg. Fahrenheit theoretically. At this point, which is from 18 to 24 in. above the tuyeres, as previously stated, the hot gases should find the charge of metal to melt. If there is fuel still above this point, by originaly charging too much fuel, the conversion to  $\text{CO}$  takes place, with consequent reduction of the temperature. It will therefore be seen that from the actual entrance of the air into the bed, there is a rapid increase in temperature upward until the maximum is reached, and then a decrease. Experience shows that melting iron is possible for a distance of about 1 ft. below this place of maximum temperature, and perhaps 2 ft. above it, if the bed were allowed to be so low or so high through improper charging. This effect can be readily understood when it is remembered that the melting point of white iron runs as

\*From a paper presented at the Cleveland meeting of the American Institute of Mining Engineers, October, 1912. Substantially the same paper was contributed to the Buffalo meeting of the American Foundrymen's Association.



low as 2000 deg. F., while that of the gray irons is several hundred degrees higher. The iron melts, but in the case of too low a bed it will be insufficiently overheated, besides having been exposed to free oxygen with all the troubles this brings about. In the case of too high a bed the metal has not been oxidized, but is so cold that even dropping through a hotter portion of the bed will not give it the proper temperature for casting.

To find the proper height of bed—and this height is not a function of the weight of the fuel, but of the amount of travel through it the air has to perform until the maximum  $\text{CO}_2$  has resulted, and with it the maximum temperature—experience again has taught us how to go about this. It has been observed that when conditions in the cupola are just right for “blast to go on,” and that is when the bed is well burned through, and the cupola charged to near the top with the metal heating up satisfactorily, it should take between 8 and 10 min. from the commencement of blowing until enough iron runs from the spout to necessitate closing up the tap hole. The melting iron dropping by the peepholes in the windbox will be observed in about 5 min. after the blast is on, but it takes a little longer to have enough metal to begin running out. If under these conditions the metal comes in less than 8 min. the bed is too low, and should be increased by charging a little more fuel between the metal charges in order to bring it up properly at the time this was observed, and the next day the bed should be made higher in the first place. If it takes longer than 10 min. the bed is too high and should be correspondingly reduced.

#### Prevent Shifting of the Melting Zone

Looking at the actual condition of the bed, in view of what has been said so far, we find that every portion of it below the tuyeres is simply so much filling intended to give storage space between the lumps of incandescent coke for the molten metal. Above the tuyeres we find the chemical reactions of combustion going on, which result in maximum temperature conditions at a given point and at which melting should be done. It further will appear that only the upper few inches of this bed will be of the maximum temperature, and below this the bed is cooler and contains the dreaded free oxygen. Hence the metal charge should be so proportioned that it is melted down completely by the time about 4 in. of the bed has been consumed. The correctness of this statement can be observed at any time in looking into the interior of a cupola the morning after a melt. In a well-regulated shop the scoring of the lining is confined to a belt of from 4 to 6 in. In a shop where the reverse conditions exist—though doubtless unknowingly, as it will be found in the best of our foundries—the belt of affected cupola lining may be 3 ft. high. The latter condition shows a shifting of the melting zone up and down according as the bed has been allowed to burn away before the succeeding charges of coke came down to replace it, or the bed had been allowed to run by charging too much coke between the charges of metal.

The inferences that must be made from the above are: 1. That the smaller the charge of metal and the oftener repeated, the less the shifting of the melting zone up and down in the cupola. 2. That it is a serious mistake to adopt the almost universal rule in the United States to make the first charge twice as heavy as the succeeding ones. Where this is done, it is patent that double the amount of coke must have been burned away from the top of the bed, only half of this being replaced by the intermediate charge of coke, and from the second charge of metal the melting is done at a lower point in the cupola. It is difficult to instill this point into the minds of cupola men and even chemists. They see a big pile of coke go into the cupola for the bed, and of necessity hold that a big lot of iron should go on it, forgetting that only the very upper portion of the bed does the work, whether the bed is big or little. European practice is more rational in this respect, for not only are cupolas of small diameter used with consequent effective penetration of blast, but the charges are very small and there is no large first charge. Like many other things, we “over-improved” the melting process when we got to the big things common here.

While the weight of the coke for the bed is not essential, it is very much so for the intermediate charges. That is to say, once the proper height of the bed has been found for a given coke, the replacement of what is burned away in melting each charge is a definite function of its

composition and somewhat of its cellular structure. Every time the brand of coke is changed, it is necessary to try out the melting time for “first iron,” in fact, in well regulated shops this is done every day—unless the shop custom is to keep the breast closed during the “burning through” and “blast on,” when it is sufficient to make the above described time trial once a week or so.

#### Weight of Intermediate Fuel Charges

It is well to use another “experience” figure for the weight of the intermediate charges of fuel. This is one tenth the weight of the metal charged above it, which it is to melt. A good high fixed-carbon coke can melt more than ten times its weight, or the ratio is, say, 11 lb. of metal to 1 lb. of coke, while a high-ash coke works the other way. Hence we have got to the point where in trying out the melting conditions required for a cupola, the first iron is wanted at, say, 8 min., the first charge of metal as small as all the others, and the charges of coke between these metal charges one-tenth in weight. It now remains to fix the size of the charges of metal.

Since about 4 in. of coke bed only should be burned away in melting the metal charge above it before the next coke charge comes down, it stands to reason that the proper size of the metal charge should be that which takes these 4 in. of coke to burn away, or 10 times the weight of 4 in. thickness of coke in the cupola. The best way to ascertain this weight is to lay a ring of cupola blocks or fire-brick on the cupola charging floor of the diameter of the cupola, and 4 in. high. Fill this space with the coke in question and weigh it. Ten times the weight is the amount of metal to be charged. Really the ideal condition is to take the proper proportions of pig, scrap and coke, mix them together as they are charged, and thus in melting a lump of coke replaces one just being burned away, and there is no shifting of the melting zone. It is an expensive way, however, and one is not apt to get the proportions charged right.

Inasmuch as during the course of a melt the cupola becomes hotter, and the upper charges well heated, naturally less coke is required between the charges, and here the experience of the foundryman comes into play. The easiest method of determining this question is to observe the rate in melting. That is to say, if a given cupola melts 10 tons an hour for the first hour, and only 9 tons the second hour, this has been because of excessive coke (other conditions being right), and a gradual and slight reduction of the intermediate charges of coke is in order, until the melting rate is restored and even accelerated a little. Continued observation quickly overcomes this difficulty.

In the case of hundreds of cupolas coming under my observation for correction of troubles, the application of the reasoning given above and the corresponding changes in practice have almost immediately overcome the difficulty.

#### Oxidation of Metal

Oxidized iron is very difficult material with which to get good castings. It seems that when the melting iron gets into portions of the cupola where free oxygen is present, it is affected thereby, and the result is a higher freezing point. The metal loses its “life” and cannot safely be held for any time. Moreover it contains gases which come out at the moment of set, with the result that the castings show evidences of pinholes, heavy shrinkages, and even cracks from loss of power to accommodate themselves to internal strains while the metal is setting. And still worse, the pinholes in question often do not appear until the skin of the castings is removed by machining. This is because when the mold is poured the metal immediately in contact with the sand sets first, and in doing so passes its contained gas through it. Once this skin has formed further gases attempting to get out are shut off, rise to the top, and will remain just under the skin of the cope. Metal of this kind always shows defects when the cope portion is planed off. The bottom of the casting as poured may be all right.

Since this condition is entirely due to the oxidation of the metal, it is important that the charging of the cupola be done very evenly and regularly. That is to say not to charge the pigs around the lining and the scrap in the center. Not only will the bulk of the metal thus be exposed to the gases rich in free oxygen which pass up along the walls, but there will be practically 16 lb. or more of metal to be melted by the pound of coke underneath along the

outside of the charges and, say, 5 lb. of metal only for the pound of coke underneath in the center. The result can only be trouble, especially where small castings are made; for the comparatively cold iron from the outer portion of the cupola, while mixing with the very hot interior portion, may give a mixture hot enough to pour all right, but that 16 to 1 metal has been damaged by oxidation, and this leaves its effect on the mixture.

#### Conditions of Successful Melting

In summing up the subject, the following conditions should be observed:

1. That the proper amount of air gets into the cupola for its capacity.
2. That the bed coke is dry and well lighted before charging.
3. That the bed is of proper height to give "first iron" in from 8 to 10 min.
4. That the metal charges are of equal weight.
5. That the metal charges are of a size requiring only coke enough to cover the metal below.
6. That the coke charges are so adjusted to the metal charges that throughout the heat the melting zone remains stationary and at the right point.
7. That the blast volume (not pressure) never changes throughout the heat, since any variation will immediately change the position of the melting zone.
8. That the charges are evenly distributed: First, the pig iron over the entire bed, then scrap also over the entire bed, then coke. If steel is used, put it on before the pig. Never use thin scrap steel.
9. That only one row of tuyeres be used, and this should be of sufficient size. If a second row is available, open only a very few of them, so as not to disturb the position of the melting zone, while giving extra air to burn the CO that may form in the furnace.
10. That the melting rate be watched and the intermediate coke charges adjusted accordingly.
11. That the charging of very large pieces of metal be avoided, since these very often deflect the gas currents and bring about an uneven burning of the fuel.

Where the above suggestions have been tried, the result has invariably been snow-white molten iron from the spout of the cupola, perfect mixing of the iron charged, and sound castings. It is to be understood that this covers only the metallurgy of the cupola melting process, and not the mechanical considerations looking toward extreme economy in operation as well as original design.

#### Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET

**EXCUSE FOR DELAYING FREIGHT.**—A railroad company cannot excuse a delay in transporting freight on account of unusually heavy traffic, if it failed to notify the shipper that a delay was probable. (Pennsylvania Supreme Court, *Joynes vs. Pennsylvania Railroad Company*, 83 Atlantic Reporter 1016.)

**FAILURE TO READ BILL OF LADING.**—The provisions of a bill of lading bind the shipper regardless of whether he reads them. (New York Supreme Court, Second Appellate Division, *Boyle vs. Bush Terminal Railroad Company*, 136 New York Supplement 355.)

**RIGHT OF STOCKHOLDER TO ACT AS NOTARY PUBLIC.**—A notary public is disqualified to take an acknowledgment to an instrument if he is a stockholder of a corporation that is a party to the instrument. (Georgia Supreme Court, *Southern Iron & Equipment Company vs. Voyles*, 75 Southeastern Reporter 248.)

**RIGHT OF SALES AGENT TO COMMISSION.**—A concern which has an exclusive sales agency for certain territory is not entitled to a commission on a sale made by the manufacturer outside such territory to a resident thereof, in the absence of trade custom to the contrary. (California Supreme Court, *Haynes Automobile Company vs. Woodill Auto Company*, 124 Pacific Reporter 717.)

**RELEASE AND MODIFICATION OF CONTRACTS.**—A contract obligation is released only by some act of Providence making performance impossible, by operation of law, or by conduct of the other party. A written contract can be modified by a subsequent oral agreement based on sufficient consideration. (Oregon Supreme Court, *Zanello vs. Smith & Watson Iron Works*, 124 Pacific Reporter 660.)

**EMPLOYER'S RESPONSIBILITY FOR LATENT DEFECTS.**—De-

fendant company is not liable to its employee for injury caused by a latent defect in a machine which the company was unloading from a railroad freight car for another company that was under contract to install the machine in the defendant company's plant. (New Jersey Court of Errors and Appeals, *Stasset vs. Taylor Iron & Steel Company*, 83 Atlantic Reporter, 881.)

**DUTY TO GUARD CEILING SHAFTING.**—A statute which requires set screws on revolving shafting to be guarded applies to shafting attached to a ceiling, if employees are at work on a scaffold so near a set screw that their clothing may be caught thereby. (Pennsylvania Supreme Court, *McCoy vs. Wolf Company*, 84 Atlantic Reporter 581.)

**EXCLUSIVE SALES AGENCY CONTRACTS.**—An exclusive sales agency contract for specified territory does not preclude the wholesale dealer who has granted the agency from making sales at his place of business outside the territory to a person residing therein. Such a contract does not violate the anti-trust laws. (Texas Court of Civil Appeals, *Nickels vs. Prewitt Auto Company*, 149 Southwestern Reporter 1094.)

**BUYER'S REMEDY ON BREACH OF WARRANTY.**—A buyer of machinery on discovering that it does not comply with the warranty on which it was sold, must choose whether he will claim damages for the breach of warranty or whether he will sue to cancel the sale. (Washington Supreme Court, *Blake-Rutherford Farms Company vs. Holt Mfg. Company*, 126 Pacific Reporter 418.)

**RIGHTS OF BUYER.**—A buyer cannot change the terms of his contract of purchase after he has given an order according to the contract and has paid the price. Where iron products were sold subject to inspection before shipment, the buyer cannot recover for defects or insufficiencies in the sizes of the articles, where, through no fault of the seller, he failed to exercise his right of inspection. (United States Circuit Court, District of Delaware, *Hitner vs. Diamond State Steel Company*, 197 Federal Reporter 850.)

**INJUNCTION AGAINST UNFAIR COMPETITION.**—When a certain surname has become well-known in connection with the manufacture of an article, a new competitor is properly enjoined from using the name unless the use is coupled with a statement distinguishing the product from that of the earlier manufacturer. (United States Circuit Court of Appeals, Second Circuit, *L. E. Waterman Company vs. Modern Pen Company*, 197 Federal Reporter 534.)

**CONTRACTS WITH UNDISCLOSED AGENT.**—When one party to a contract does not disclose that he is acting for a third person, the other party, on discovering that fact, cannot hold both, but must elect whether he will hold the first mentioned party or his principal. (South Carolina Supreme Court, *Goodale vs. Page*, 75 Southeastern Reporter 700.)

**BREACH OF WARRANTIES OF ENGINES.**—Though the seller of an engine fails to make it comply with a warranty upon which it was sold, the buyer cannot offset against the price any losses arising from lack of motive power to operate his machinery, if lack of capacity of the boiler, for which the seller was not responsible, would have prevented the generation of sufficient power, even if the engine had been all right, and if the loss caused by the defective condition of the engine cannot be separated from the loss caused by the insufficient boiler. (Washington Supreme Court, *Hallidie Company vs. Washington Brick, Lime & Mfg. Company*, 126 Pacific Reporter 96.)

**ACCEPTANCE OF CHECK AS SETTLEMENT.**—A creditor who receives a voucher check showing on its face that it is tendered in full cannot avoid the effect of its acceptance as a complete settlement by erasing the words "in full." (New York Supplement, Appellate Term, Second Department, *John J. Daly Iron, Steel & Metal Company vs. U. S. Metal & Mfg. Company*, 137 New York Supplement 150.)

**NOTICE OF RIGHT TO DIVERT WATER.**—A purchaser of land along a stream has no right of action against an iron company for its diversion of water from a point above, where he knew when he purchased that the company maintained a dam, and inquiry would have disclosed an unrecorded agreement, entitling the company to divert water. (Pennsylvania Supreme Court, *Eshelman vs. Parkesburg Iron Company*, 84 Atlantic Reporter 399.)

**RESPONSIBILITY OF TELEGRAPH COMPANY FOR MISTAKE.**—A buyer, as well as the seller, on discovering a mistake by a telegraph company in transmitting the seller's offer, whereby a lower price is made than the seller intended, is entitled to cancel the contract formed by his acceptance of the offer, and can hold the telegraph company for damages naturally and directly resulting from such mistake. (Alabama Court of Appeals, *Western Union Telegraph Company vs. Anniston Cordage Company*, 59 Southern Reporter 757.)



**CARRIER NOT ENTITLED TO RELY ON SHIPPER'S OFFENSE.**—A carrier of freight cannot defeat liability for failure to promptly and safely transport a shipment because the shipper violated the interstate commerce act by giving a wrong classification or wrong weights. (Georgia Supreme Court, Adams Express Company vs. Chamberlin-Johnson-DuBose Company, 75 Southeastern Reporter 601.)

**CORPORATION AS LIFE INSURANCE BENEFICIARY.**—A stockholder's life may be insured for the benefit of his corporation where the company is largely dependent upon his skill and experience for the success of its operations. (Ohio Supreme Court, Keckley vs. Coshocton Glass Company, 99 Northeastern Reporter 299.)

**STOPPING SHIPMENTS IN TRANSIT.**—An unpaid seller's right to stop delivery of a shipment to the buyer, on discovering that the buyer has become insolvent, may be exercised any time before there has been actual or constructive delivery of the freight, unless the bill of lading has been transferred to a bona fide purchaser for value. The words "not negotiable" on the face of a bill of lading puts an assignee on inquiry as to the consignor's rights, and if he unreasonably delays obtaining possession of the shipment until the consignor has exercised his right of stoppage in transit, the carrying railroad company is not liable for refusing to deliver to him on surrender of the bill of lading. (New York Supreme Court, Second Appellate Division, Gass vs. Southern Pacific Company, 137 New York Supplement 261.)

**INJURY TO EMPLOYEES BETWEEN CARS.**—A steel company is not liable for the death of a furnace boy who was crushed between two cars while crossing a track, if the employees who moved the cars had no notice of his perilous situation. (Kentucky Court of Appeals, Koke's Administrator vs. Andrews Steel Company, 149 Southwestern Reporter 968.)

**NOTICE OF INJURY UNDER NEW YORK EMPLOYERS' LIABILITY ACT.**—An employer does not waive his right to the notice of injury required by the New York employers' liability act before suit can be brought, by paying an injured employee an amount equal to his wages for the time he was incapacitated. (New York Supreme Court, Second Appellate Division, Schultis vs. Waterbury Company, 137 New York Supplement 352.)

**VALIDITY OF EXCLUSIVE SALE CONTRACT.**—It is no defense to an action for the price of goods that they were sold under a contract which restrained freedom of trade by providing that the seller would rebate a specified portion of the price at the end of a fixed period if the buyer should not have bought elsewhere or resold goods during that period. (Georgia Court of Appeals, D. R. Wilder Mfg. Company vs. Corn Products Refining Company, 75 Southeastern Reporter 918.)

**RIGHTS OF BUYER ON REFUSING TO ACCEPT DELIVERY.**—When a buyer notifies a seller that any further delivery will be rejected, the latter need give no notice before selling the goods for the buyer's account. (Michigan Supreme Court, Habicht, Braun & Co. vs. E. B. Gallagher & Co., 137 Northwestern Reporter 685.)

**WORKMEN WHO ARE NOT "FELLOW SERVANTS."**—A workman directed to repair a defective condition which imperils another workman cannot be regarded as a fellow-servant, for whose negligence the employer would not be liable, but must be treated as the employer's representative. (Michigan Supreme Court, Courtois vs. King Paper Company, 137 Northwestern Reporter 699.)

**IMPLIED WARRANTIES BY MANUFACTURER OF ARTICLES.**—A manufacturer of articles intended for a particular use impliedly warrants that they are reasonably suited therefor, unless the buyer furnishes specifications, in which case the manufacturer is merely bound to follow them. If the purchaser retails the articles without offering to return them, he cannot claim any deduction from the price on the ground of defective quality. (Michigan Supreme Court, Gill & Co. vs. National Gaslight Company, 137 Northwestern Reporter 690.)

**RESPONSIBILITY FOR SALESMAN'S MISREPRESENTATIONS.**—Where a manufacturer in selling machinery to a wholesaler furnishes a salesman to aid in making re-sales, the salesman is properly regarded as the wholesaler's and not the manufacturer's representative in making misrepresentations to the wholesaler's customers concerning the machinery. (Maine Supreme Judicial Court, Doylestown Agricultural Company vs. Brackett, Shaw & Lunt, 84 Atlantic Reporter 146.)

**RIGHT TO RECOVER PENALTY FOR EXCESSIVE FREIGHT CHARGE.**—A consignee of freight who pays an excessive freight rate without objection is not entitled to recover from the railroad company a statutory penalty for overcharge. (South Carolina Supreme Court, Stallings vs. Southern Railway Company, 75 Southeastern Reporter 449.)

**PLACE FOR DELIVERY OF GOODS SOLD.**—The place for delivery of goods sold is where they are located when the contract of sale is made, in the absence of agreement to the contrary. (Oregon Supreme Court, Mann & Beach vs. Flynn, 125 Pacific Reporter 274.)

**WHEN BUYER MUST TENDER RETURN OF GOODS.**—Before a buyer is entitled to refuse to pay the price of goods on the ground that they are defective in quality, he must offer to return them. (Texas Court of Civil Appeals, Ohio Pottery & Glass Company vs. Black, 149 Southwestern Reporter 735.)

**RIGHTS OF BUYER ON SELLER'S DEFAULT.**—When a seller of machinery furnishes cast iron instead of steel parts as agreed, and on being notified of their breaking promises to send new parts, but repeatedly sends cast iron ones, resulting in frequent interruptions in using the machinery, the buyer is entitled to recover consequent damages, though the contract of sale purported to limit his remedy to a return of the machinery on account of the breach of warranty. (Minnesota Supreme Court, Detwiler vs. Downes, 137 Northwestern Reporter 422.)

## New Tools and Appliances

*This is essentially a news department for which information is invited*

**Automatic Knife Grinding Machine.**—For grinding paper cutter knives and shear blades, the Northampton Emery Wheel Company, Leeds, Mass., is manufacturing a heavy cup wheel automatic knife grinding machine in a variety of sizes. A pawl and ratchet actuated by a trip which can be set for any desired capacity operates the automatic feed of the knife bar to the wheel, which is from 0.0002 in. up, and the feeds can be operated by hand by disengaging this trip. The grinding head swivels on the base and can be set to any desired degree of concavity of the bevel of the knife blade. The knife bars, which are adjustable and have a dial graduated in degrees at one end, are so designed that the knife must be mounted with the cutting edge up so that it can be readily inspected during the grinding operation without stopping the machine. A large settling tank for water which is made in two parts is provided. The drippings from the water channels run into the smaller upper portion, which is perforated near the top, so that the water flows through into the larger tank and is thus returned to the pump, while the emery, grit and dust settle down to the bottom of the small tank, from which they can be removed easily as often as required.

**Hydraulic Presses.**—Three hydraulic presses have been recently developed by the Hydraulic Press Mfg. Company, Mt. Gilead, Ohio. One of these is an inverted portable forcing press which can be used as an arbor press by boring a hole in the platen. The return of the ram is effected by a rack and pinion placed in the back of the cylinder which is made separate from the beam. All the parts subjected to stress are made of steel and the pump has a 3/8-in. piston with a 3 1/2-in. stroke. Another press is intended for heavy forming work and is equipped with two pumps to increase the speed of the ram at starting. Steel is used for the platen, pressure head and strain rods and the maximum stress is 100 tons. The third press is designed for forcing wheels on and off axles, and as soon as the press is released weights and chains draw back the rams. This press is operated by motor drive or by a power attachment with tight and loose pulleys for operating with a belt.

**Multiple-Spindle Drilling Machine.**—The National Automatic Tool Company, Richmond, Ind., has brought out a new type of multiple-spindle drilling machine, which in general construction is the same as the one which was illustrated in *The Iron Age*, October 31, 1912. The machine is furnished with one or more cluster heads and the drive is by universal joints and a center shaft. Ball thrust bearings and adjusting nuts to compensate for wear are provided for the spindles. To take care of the variation in the length of the straight shank drills used, a vertical adjustment is provided within the spindle. The regular center distances between the drills are 21-32 and 25-32 in., depending upon the size of the hole to be drilled. The circular range of the head is 8 3/4 in. and the working surface of the base is 14 1/2 in. square, the over-all surface measuring 17 1/4 x 18 1/4 in. The machine can be mounted upon a bench or on a stand, as may be desired.

# The Machinery Markets

With the season near at hand when there is a slowing up tendency in buying, the interest of the machinery trade at large is centered to a considerable extent in the business outlook, and the future looks good as seen in most of the important-distributing centers. Inquiries are reported generally to be abundant, and these, together with prospects in process of formation though not yet actually before the trade, form the basis on which the future is estimated. New York did a good volume of trade in November and for the time of year industrial building operations are unusually noticeable. Miscellaneous business of fair proportions continues in Philadelphia. The volume of inquiries speaks well for the future in New England, where manufacturers to whom improvement came rather slowly are now busy. Cleveland is anticipating a seasonable lull, but has plenty of inquiries and will profit by the activity of its automobile factories. The bulk of Cincinnati's business consists of single tool orders with the best demand coming from the automobile, gas engine and electrical trades. In Detroit makers of automobile accessories have been good contributors to trade; the November movement was fair and prospects are encouraging. Buying has been well sustained in Chicago and prospective demand and current inquiry for power equipment are promising as a result of late building operations. The Central South is looking forward to renewed good business. While sales have been quiet in St. Louis an increase in inquiries is noticeable. Indications point to continued good business in Texas, where the month of November was exceptionally good. On the Pacific coast the total volume of orders has been slightly increased as a result of the large amount of repair and construction work called for by the logging trade, although the season is one when that industry usually is quiet. Inquiries are coming also from the Alaskan canning trade.

## New York

NEW YORK, December 4, 1912.

November's volume of business reached an excellent total in the New York market, though with most houses the month was not quite as good as the preceding one. There is some excellent business in prospect and the point which most keenly interests the trade is whether formal calls for estimates on this prospective business will come out before the end of the year. Meanwhile the run of miscellaneous demand continues fair but with a tendency toward the quiet which usually prevails near the end of the year. The big list of requirements of the Boston & Maine Railroad for its Billerica shop is understood to be complete and awaiting directions. The Norfolk & Western which has a fair sized list before the trade has not yet placed its business and other railroads are proceeding slowly. In the New York territory the construction of plants for new industrial enterprises and additions to those already established are more numerous than they have been in some time. They are especially noticeable at this time of the year when such operations usually fall off. The continued mild weather has permitted the carrying on to advantage not only of building construction, but other kinds of outdoor work as well.

A. Schrader's Son, Inc., 32 Rose street, New York, has awarded a contract to the Turner Construction Company, 11 Broadway, for the erection of its new factory building at Clermont and Atlantic avenues, Brooklyn. It will be a reinforced concrete structure, 100 x 225 ft., seven stories. Howard Chapman is the architect.

Plans have been perfected and work will soon be started on a new factory building for Baker & Co., Inc., platinum refiners, at the southeast corner of Murray and Austin streets, Newark, N. J. The building will have a 50-ft. frontage on Murray street and extend along Austin street for 188 ft. The estimated cost is \$80,000.

The Siegwart Beam Company of New Jersey, recently incorporated with \$150,000 capital stock, has purchased the site of the Lienau Iron Works, at Prospect and Coyt streets, Irvington, a suburb of Newark, N. J. Plans are being prepared for a structure 75 x 200 ft., which is to be the main building of its plant. It is to manufacture hollow reinforced concrete beams and other building materials under foreign patents. The equipment is to be mostly of a special nature and includes the most approved labor saving devices, power plant and machine tools for repairs. The officers of the company with offices at 207 Market street, Newark, are G. A. Kruttschnitt, president, and Jerome D. Gedney, secretary-treasurer.

The Steel Products Enameling Company, Farmingdale, N. Y., has been incorporated with a capital stock of \$91,000 and will establish a plant for the manufacture of steel and the enameling of steel products. W. B. Walsh, Brooklyn, and W. E. Kelly and W. L. Glenn, New York City, are the incorporators.

The Knickerbocker Portland Cement Company

Hudson, N. Y., is building an addition to its plant which will increase its daily output by 250 bbls.

J. D. Hurd, Albany, N. Y., has let the general contract for a two-story machine shop which he will build at 42 Beaver street.

The E. H. Nelson Bottling Works, Hornell, N. Y., will erect and equip on Canisteo street a two-story and basement bottling plant 37 x 150 ft., of reinforced concrete construction.

The Troy Gas Company, Troy, N. Y., has completed arrangements for the installation of new equipment in its Liberty street power plant which will require an expenditure of about \$100,000.

The Troy Hospital, Troy, N. Y., has awarded to C. P. Boland & Co., Troy, the general contract for the construction of hospital buildings 58 x 341 ft. and 53 x 71 ft., boiler house 46 x 85 ft. and laundry building 52 x 64 ft., of brick and steel construction, to cost \$400,000.

Work will soon be started on a factory building for the Wright's Health Underwear Company, Troy, N. Y., by the Industrial Engineering Company, Albany, which has the general contract for construction.

The Blasier-Sanborn Mfg. Company, Utica, N. Y., recently incorporated with a capital stock of \$350,000 to take over and continue the business of the M. E. Blasier Mfg. Company, maker of pressing machines, hardware specialties and wind shields for automobiles, is erecting an addition to the present plant.

The Rome Brass & Foundry Company, Rome, N. Y., has commenced work on an addition to its mill which is to be 135 x 150 ft., one story, and will cost \$25,000.

The plant of the Syracuse Stove Works on Geddes street, Syracuse, N. Y., has been purchased by the Palmer-Moore Company, which will equip and operate it for the manufacture of motor trucks.

E. C. Stearns & Co., Syracuse, N. Y., have leased the Economy foundry plant in that city and will make extensive improvements and install new equipment. Upon completion of the betterments the foundry, which is of large capacity, will be operated to care for the rapidly increasing business of the Stearns Hardware Mfg. Company, controlled by the first named company, and enable it to double the output of its present foundry on Oneida street.

The Bastian Bros. Company, Rochester, N. Y., has had plans completed for a three-story factory addition 45 x 110 ft. Crandall & Strobel, architects, are receiving bids for its construction.

The Spirella Company, Inc., Niagara Falls, N. Y., has been incorporated with a capital stock of \$1,400,000. The company, which has an extensive plant in operation at Niagara Falls, will at once erect and equip a large addition to it. G. W. Knox, Niagara Falls, and W. S. Smith and I. B. Saunders, Meadville, Pa., are the directors.

The Pratt & Letchworth Company, Buffalo, N. Y., J. C. Bradley, president and general manager, has increased its capital stock from \$800,000 to \$2,400,000.

The Standard Oil Company is adding to its Atlas Works plant at Elk street and the Buffalo Creek Terminal Railroad, Buffalo, a two-story brick receiving house for stills and a one-story brick addition to its pulp oil building.



The Sterling Engine Company, Buffalo, is erecting a brick and steel addition 120 x 150 ft., one story, to its plant at Niagara street and Auburn avenue, that city.

The Independent Rendering & Glue Corporation, Cheektowaga, N. Y., a suburb of Buffalo, has been incorporated with a capital stock of \$50,000 to operate a rendering works and a glue manufacturing plant. J. V. Walsh, A. A. Collins and C. M. Gafney are the directors.

The Remington Typewriter Company, Ilion, N. Y., is having plans prepared for a further addition to be made to its plant.

The Atlas Crucible Steel Company, Dunkirk, N. Y., A. H. Hunter, president, has given a contract to the Union Builders' Association for the construction of its new steel plant; two buildings, each 60 x 100 ft., of structural steel and brick.

The Dunkirk Steam Laundry Company, Dunkirk, N. Y., will erect a new building 80 x 90 ft. and build an 80 x 80 ft. addition to its present building. New equipment will be added.

The International Casement Company has been incorporated at Jamestown, N. Y., with a capital stock of \$50,000 to manufacture casement windows of leaded and stained glass. Plans for a factory are in preparation. The incorporators are J. A. Westman, T. H. Ringrose and C. A. Ogren, Jamestown.

The weave shop of the James Thompson Company's mills, Valley Falls, N. Y., which was practically destroyed last week with costly machinery and other contents is to be rebuilt and re-equipped at once.

The Jamestown Oil Company, Jamestown, N. Y., is to build an oil warehouse and compounding plant on Steel street.

The Jamestown Panel Company, Inc., Jamestown, N. Y., has filed incorporation papers with a capital stock of \$50,000 to manufacture interior woodwork, etc., and will establish a plant. H. H. Roberts, N. M. Wilson, Jamestown, and F. Morrison, Warren, Pa., are the directors.

## New England

BOSTON, MASS., December 3, 1912.

A notable commentary on conditions in the machine tool trade rests in the fact that manufacturers whose business has been slow to respond to the general improvement now find their orders of much greater volume and are very well satisfied with the outlook as defined by inquiries. The trend is toward higher prices, though advances are not numerous and of small percentage. No large lists are out. The railroads are placing scattering orders for single machines. The indications are that a good deal of industrial building will be done this winter and in the early spring, for which much equipment will be required. Most of these plans are yet to be announced. It is of interest that the International Silver Company, Meriden, Conn., operating factories in several Connecticut cities and towns, is closing the most prosperous year in the history of the business.

Frank F. Woods has sold his interest in the S. A. Woods Machine Company, Boston, to Charles W. H. Blood and H. C. Dodge. Mr. Dodge is the president of the corporation and Mr. Blood the vice-president and treasurer, and the management will be divided between them. The transaction carries with it the control of the business, for Mr. Woods has been the dominant factor in the ownership for some years since the death of S. A. Woods, his father, and the founder of the business. The company operates a large, modern plant in South Boston, specializing on wood planing and moulding machinery, and is one of the most important houses in this line of equipment in the world. The policy of the management will remain unchanged. Mr. Blood has been connected with the business for 21 years and Mr. Dodge for 10 years, and were associated with Frank F. Woods in the simplification and complete modernizing of the company's product which has been effected in recent years. The S. A. Woods Machine Company was a pioneer in the American woodworking machinery business, dating back to 1859.

Houghton & Richards, Boston, importers and dealers in tool steels, have leased the large store with basement at 145 Oliver street and will take possession January 1. The present quarters of the firm are at 150 Oliver street, at the corner of Purchase street, and their new store is diagonally across the way at the juncture of the same streets. The change will afford largely increased space for the storage of steel as well as much greater office room.

The Stafford Company, Readville, Mass., manufacturer of woolen looms, has plans prepared for a four-

dry and an addition to its machine shop, which will greatly increase the present producing capacity. The business is young and its growth has been very rapid.

The purchasing for the power plants of the Connecticut valley will be concentrated still further because of the sale to the Connecticut River Power Company of the property of the Bellows Falls Power Company, which controls the second largest water power on the river.

The new factory of the Trenton Flint & Spar Company, Topsham, Maine, has been destroyed by fire with a loss of \$50,000, and the mill of the Rockingham Paper Company, Bellows Falls, Vt., with a loss of \$100,000.

The Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., has purchased from the Wyman & Gordon Company the property on Southgate and Armory streets, recently owned by the International Power Company. The Wyman & Gordon Company acquires by the transaction the foundry property of the Whitcomb-Blaisdell Company on Gold street. The exchange is extremely advantageous to both houses. The Southgate street plant is admirably adapted for foundry purposes and will be so used by its new owner. The present large building, one story with monitor roof and crane bay, will be extended 100 ft. and will be equipped with two electric traveling cranes of 5 and 15 tons capacity respectively, for which the company will be in the market. The plant has a railroad siding. The work of building and of transferring the foundry equipment to the new location will begin immediately, as the company has agreed to turn over the Gold street property to the Wyman & Gordon Company in the early spring. The foundry capacity will be increased considerably over the present plant, and facilities will be greatly improved. The 90,000 sq. ft. of land in the estate will permit of future extensions as they may be needed for foundry or machine shop purposes. The company's shops for the manufacture of lathes and planing machines will be continued on Gold street. The Wyman & Gordon Company acquires 50,000 sq. ft. of land adjacent to its present works and completes a square. The company will remodel the buildings and will add to them, with the purpose of increasing its forge shop facilities about 50 per cent. For building \$75,000 will be expended and a large amount of new equipment will be installed, including hammers, which have been contracted for.

The G. E. Wood Tool Company, Plantsville, Conn., manufacturer of mechanics' tools, will rebuild immediately the structure which was damaged by fire recently, and proposes to be operating again by the middle of the month and to be shipping goods by the first of the year. The business is a department of the Stanley Rule & Level Company, New Britain, Conn.

Additions to general manufacturing facilities of New England include the Polack Tyre & Rubber Company, 246 West Fifty-ninth street, New York, factory at Bridgeport, Conn., containing 20,000 sq. ft. of floor space, to manufacture truck tires; Milton Bradley Company, Springfield, Mass., factory to cost \$55,000; Winterbottom Book Cloth Company, Ltd., to remodel plant at East Killingly, Conn.

The L. W. Pond Machine & Foundry Company, Worcester, Mass., will erect a two-story addition, 100 x 150 ft., of brick and cement, with saw tooth roof.

## Philadelphia

PHILADELPHIA, PA., December 3, 1912.

A fair volume of miscellaneous business is moving but the market lacks snap with a tendency toward irregularity. This is believed to be attributable in large part to the approaching year end. The intervening holiday may also have been the cause of a lighter volume of new business in the week. While inquiries have been less numerous, manufacturers continue fully engaged and for the most part have sufficient business on their books to keep them occupied for months. The Baldwin Locomotive Works is operating to full capacity and has orders on hand to keep it so engaged well into next spring. Buying of machine tool equipment by the railroads continues light. A moderate amount of new inquiry is reported by second hand machinery merchants. The demand for power equipment has been dull. Both iron and steel casting plants continue well engaged and report a fair volume of new business.

The Pennsylvania Railroad has an inquiry out for a small direct connected centrifugal pump.

Tinius Olsen, who has for the past 32 years been manufacturing testing machinery in this city, has incorporated his business under the name of the Tinius Olsen Testing Machine Company with a capital stock

of \$100,000 under Pennsylvania laws. Tinius Olsen is president; Thorsten Y. Olsen is vice-president and treasurer, and H. W. Boyd, secretary. The business will be conducted as heretofore, although facilities for manufacturing will be largely increased in the near future.

The Brighton Worsted Company, Tioga and D streets, is planning two three-story additions, one 50 x 159 ft. and the other 33 x 59 ft., and one-story addition 34 x 50 ft. It is reported that the Joseph Berg Company will erect these additions.

The William Cramp & Sons Ship & Engine Building Company is preparing to build a one-story addition to its foundry at the corner of Richmond and Cumberland streets.

The F. A. Poth & Sons Brewing Company, Thirty-first and Jefferson streets, has had plans prepared for a two-story addition to its boiler house.

The partnership of G. Edward Smith and William H. Hansell trading as Smith & Hansell and the Philadelphia Iron Foundry was terminated November 25 and will be succeeded by a corporation to be known as Smith & Hansell, Inc., which will carry on the business at the present plant at Fifth street and Columbia avenue.

The Berger Bros. Company, 237 Arch street, has had plans prepared and is taking bids for a five-story office and warehouse building 31 x 65 ft. to be erected at the corner of Broad and Arch streets, but the work of building will not be started until April 1. On completion of the new building the present office and warehouse at 237 Arch street will be used for manufacturing purposes.

The Ballinger & Perrot, engineers, have prepared plans and are taking bids for a two-story brick and concrete factory building to be erected for Jacob Gerhardt, Hazelton, Pa. The building will be 60 x 190 ft. and will replace one recently destroyed by fire.

The Rota Engine Company, Wilmington, Del., has been incorporated with a capital stock of \$100,000 and will manufacture and sell engines, motors, etc. The incorporators are Isaac Fogg, George D. Hopkins and George W. Dillon, all of Wilmington.

The American Phosphorus Company, Third and Dauphin streets, is preparing to erect a brick addition 36 x 133 ft., two stories, to its plant at Cly, Pa. It manufactures phosphorus and phosphorus compounds and will install a number of electrical furnaces in the new addition. It is also considering the enlargement of its present boiler capacity.

Andre Martin, manufacturer of velvet and plush goods, has had plans prepared by Ballinger & Perrot, engineers, for the erection of a manufacturing plant at Clearfield, Pa. The buildings will consist of a weave shed 146 x 150 ft. and a boiler house 44 x 54 ft. and are intended to form a unit to be followed later by the erection of four buildings of the same size, also an engine room and machine shop.

The planing mill of John Griffie & Co., Front and Arch streets, Camden, N. J., was badly damaged by fire last week.

## Chicago

CHICAGO, ILL., December 3, 1912.

Some explanation of the well sustained buying of machine tools by the general manufacturing trade may be found in the unusual continuance of the fall building season. In a number of instances plant extensions contemplated for next spring are now under construction. On the other hand, numerous building plans that involve structural steel have been delayed through inability to obtain that material. The past week brought out a number of inquiries for small groups of tools and several sales are reported. The Chicago, Milwaukee & St. Paul Railway closed for a small list of machines on one of its requisitions, distributing the orders through several machinery houses. The rapid completion of its new shops at Joliet makes the buying of tools by the Elgin, Joliet & Eastern imminent, and it is understood that the large list from this company will be closed within a week. There is a large prospective demand as well as a substantial current inquiry for power equipment in this territory. This is particularly true of electric machinery both for power station work and municipal lighting.

Emil Poeppel, 3433 Leavitt street, Chicago, has plans prepared and is taking figures for a new machine shop 25 x 70 ft., one story.

The Briggs-Chicago Mfg. Company has been incorporated with a capital stock of \$60,000 by F. C. Wilcox, M. A. Preston and A. G. Discus. It is building a

plant at Waukegan, Ill., for the manufacture of contractors' equipment and machinery.

The Chicago Steel Products Company, Chicago, has been incorporated with a capital stock of \$5000 to engage in manufacturing and construction work. The attorney for the company is Egbert Robertson, 38 South Dearborn street.

The Chicago, Rock Island & Pacific Railroad is receiving figures for the erection of a boiler house and engine house in Chicago to be 60 x 210 ft., one and two stories.

The William Piano & Organ Company, 14 Washington street, Chicago, has taken out a permit for the erection of a five-story concrete factory building on Fullerton avenue.

Burr & Co., Champaign, Ill., are building a new foundry and structural steel shop 120 x 268 ft., one story.

The Commonwealth Edison Company, Chicago, has taken out a building permit for a new power house 186 x 263 ft., the cost of which will be \$600,000.

J. E. Pickham, 830 South Central avenue, Chicago, is building a boiler shop 65 x 129 ft., one story, to cost \$4000.

The Corn Products Company's plant at Waukegan, Ill., was severely damaged by an explosion, a portion of the buildings being wrecked with a loss estimated at \$100,000.

The Northern Brass Company, Waukegan, Ill., has begun the construction of an addition to its plant which is the forerunner of more extensive building in the spring.

The new Joliet shops of the Elgin, Joliet & Eastern Railroad have progressed in their construction far enough to permit the erection of cranes, and steel is in place for 440 ft. of the total length of 572 ft.

Work is already in progress for the rebuilding of that portion of the Terre Haute plant of the American Car & Foundry Company which was recently destroyed by fire.

The Oake Packing Company, Rockford, Ill., has been incorporated with \$100,000 capital stock by Richard W. Oake, William K. Pattison and Irwin M. Berner.

The United Metal Parts Company, Indianapolis, Ind., has been incorporated with a capital stock of \$10,000 to engage in a metal manufacturing business. The organizers are C. F. Nickels, O. Craig and M. Meany.

The Standard Tool & Mfg. Company, Indianapolis, Ind., recently incorporated, has completed the erection of its factory building, 100 x 300 ft., and is now making purchases for its equipment. The company will manufacture motor cycles, gas engines, small tools and devices for motor cycles.

## Cleveland

CLEVELAND, OHIO, December 3, 1912.

Dealers generally report a lull in buying, which is attributed largely to the fact that manufacturers are deferring the placing of orders until after inventory time in January. New orders are nearly all for single tools in small sizes, and inquiries are not plentiful. With some machinery houses the volume of business in November was about as large as in the previous month, but with others sales fell off considerably as compared with October. While some dealers are disappointed with the present volume of business reports from builders of machine tools continue very favorable. Makers of automatic machines and turret lathes state that the demand continues heavy, having shown no falling off since election. A representative of a large foreign machinery house who was in the city during the week stated that the Balkan situation was affecting the European machinery market in that some of the larger buyers are holding back on purchases until the war clouds clear away. The demand for cranes and other handling equipment continues active. The demand for gas producers is still heavy.

The Guide Motor Lamp Mfg. Company, Cleveland, has awarded a contract for the erection of a new factory building at Madison avenue, N. W., near West 114th street. The building will be 60 x 130 ft., two stories and basement, of brick, steel and reinforced concrete construction.

The Davies-Bach Mfg. Company, formerly the Davies Mfg. Company, Alliance, Ohio, has placed a contract with the McClintic-Marshall Construction Company, Pittsburgh, for the erection of another factory building to be used for the manufacture of automobile frames and heavy stampings. The building will be 80 x 206 ft., of brick construction. Its equipment will include 16 presses of various sizes. The presses will be furnished



by the Toledo Machine & Tool Company, Toledo, Ohio. It is announced that other buildings will be added during the coming year. The company will have its main offices in Cleveland.

The National Stove Company, Lorain, Ohio, will enlarge its plant by the erection of an enameling plant 60 x 110 ft. with a 28-ft. wing at one end. It will be a one-story brick structure.

Plans have been prepared for a new county power plant to be built in Toledo, Ohio, by the County Commissioners, to furnish heat for the county tubercular hospital and county infirmary. Three 150-hp. boilers will be installed.

The Worthmore Washing Machine Company, Toledo, Ohio, has been incorporated with a capital stock of \$10,000 by Frank M. Sale, Arthur J. Richie, F. A. Carabin and others.

The city of Cleveland, through the Director of Public Service, will receive bids December 10 for an electric traveling crane for the fire service pumping station.

The American Tire & Rubber Company, Akron, Ohio, has completed a three-story addition to its plant which will be devoted to the manufacture of solid tires. This company will shortly install equipment for making a complete line of steam packing. To care for its increased business and to bring out its new products the directors of this company have passed a resolution recommending to its stockholders an increase in its capital stock from \$200,000 to \$500,000.

The Summitville Brick Company, Summitville, Ohio, is planning the erection of a large plant, including a main building 150 x 150 ft., which will be equipped with brick making machinery.

The plant of the Art Mfg. Company, Zanesville, Ohio, has been sold by the trustees in bankruptcy to Secretary Serkovich, of the Zanesville Chamber of Commerce, acting for an outside concern whose name has not as yet been divulged. It is expected that the plant will shortly be placed in operation.

A new manufacturing plant will be built in Elyria, Ohio, by the Troxel Mfg. Company, maker of bicycle accessories.

The Conneaut Can Company, Conneaut, Ohio, will enlarge its plant by the erection of a new building 80 x 104 ft. to be used for a veneer and box mill.

The Ohio State Stove Company, Columbus, Ohio, is enlarging its plant by the erection of a two-story brick addition.

The Ergy Register Company, Dayton, Ohio, has had plans prepared for the erection of a four-story steel and concrete factory building to be erected adjoining its present plant. The building will be 90 x 180 ft.

A new cold storage plant will be erected in Akron, Ohio, by the C. A. Schell Provision Company.

The village of Bryan, Ohio, is offering for sale \$5000 worth of bonds the proceeds of which will be used in remodeling the municipal water works and electric light plant and installing additional power machinery.

## Cincinnati

CINCINNATI, OHIO, December 3, 1912.

Reports from quite a number of machine tool builders indicate that the usual number of single tool orders are coming in steadily, while others state there has been a falling off in the past few days. The railroads are not doing much buying in this territory, but there is a fair demand for replacement tools from the automobile manufacturers. Quite a number of small tools are also being taken by automobile repair shops in different parts of the country. Electrical machinery, of all kinds, is in excellent demand, especially the smaller units of generators and motors. Gas engine manufacturers are also very busy. Most of the jobbing foundries in this section have about all the work they can take care of just now, but, on account of the scarcity of coke, many of them will doubtless welcome the chance to close down during the coming holiday season.

The Estate Stove Company, Hamilton, Ohio, is having plans prepared for an addition to its plant, 70 x 175 ft., five stories and of regular mill construction. A two-story addition will also be made to an existing manufacturing building. The company also intends to install a central power plant.

The Boob Wheel Company, Cincinnati, manufacturer of hardware specialties, has increased its capital stock from \$10,000 to \$40,000, and has changed its name to the Wheel, Shaft, Top & Hardware Mfg.

Company. It is understood the company will increase its manufacturing facilities at an early date.

The Davenport Locomotive Works, Davenport, Iowa, has opened a branch office in the First National Bank Building, Cincinnati, with H. T. Armstrong in charge.

The Progressive Foundry Company, Dayton, Ohio, will soon be ready to install equipment in its new foundry on Ludlow street. The main building is of brick, 100 x 110 ft., one story. The company was organized this year, with J. W. Wroe, president, and J. F. Clark, vice-president and general manager. It will make a specialty of brass and alloy castings.

The Adams Husker Company, Marysville, Ohio, is erecting an addition to its plant, 56 x 170 ft., two stories and of concrete and steel construction. Only a small amount of power equipment will be required.

The Robbins & Myers Company, Springfield, Ohio, manufacturer of electric specialties, is installing machinery in a new four-story factory addition, 40 x 160 ft., of reinforced concrete construction. A two-story addition is also being made to one of its old buildings. A Grinnell sprinkler system will be installed throughout the company's entire plant. Nearly all machinery equipment has been purchased.

It is reported that the Mead Engine Company, Dayton, Ohio, has plans under way for an extensive addition to its plant. Nothing is known as to the machinery requirements.

The Blanton-McKay Sales Company, Cincinnati, has been incorporated with \$125,000 capital stock, and expects to soon enter into the manufacture of a patented cream separator. The company's present offices are at 304 First National Bank Building.

The municipality of Forest, Ohio, is contemplating the installation of an electric light plant.

Power equipment and special machinery will be purchased by the Irving Drew Shoe Company, Portsmouth, Ohio, for installation in a five-story shoe factory addition, plans for which have been prepared by Architects Richards, McCarty & Bufford, Columbus, Ohio.

The Springfield Light, Heat & Power Company, Springfield, Ohio, has tentative plans under way for enlarging its power house, and will probably be in the market next spring for considerable electrical and other equipment.

## Detroit

DETROIT, Mich., December 3, 1912.

Conditions in the Detroit machinery market were very fair in November and a good volume of business was transacted. Encouraging reports are received from dealers as to the outlook for the coming month and it is the general belief that the present good demand for machine tools will continue. Orders the past week were fairly plentiful and ranged in size up to six tools. Some equipment is being purchased by the makers of automobile parts, but from the car builders themselves little business is reported. Manufacturers of gas engines are crowded with orders. Some new inquiry has come out for woodworking machinery from the furniture industry in western Michigan. Machine shop supplies are in good demand. The market for second hand machinery is rather narrow and spotty. Building operations are about normal for this time of year, with a fair amount of new work coming out.

The Gearless Differential Company, Detroit, has been incorporated with a capital stock of \$20,000 by George D. Bailey, William F. Trudeau and Frank Howarth. The new company proposes to manufacture a gearless shifting device for use on motor cars.

The Detroit Motor & Machine Company, Detroit, has been incorporated with \$150,000 capital stock by H. J. Hayes, H. H. Smith and others. The new company is in the nature of a reorganization of an existing corporation of the same name, manufacturing motors and automobile parts, and the additional capital involved will permit of an expansion of the business.

The Griswold Press, Detroit, printer, has had plans prepared for the erection of a new plant. The building will be 50 x 130 ft., three stories and of concrete and brick construction.

The Hudson Motor Car Company, Detroit, has begun the construction of an addition to its power plant.

The Superia Cigar Company, Detroit, is building a large addition to its factory.

The Morgan & Wright Company, Detroit, tire manufacturer, is beginning work on a five-story addition to its plant, 94 x 250 ft., to cost about \$100,000. From

present plans it is intended to use the new addition for warehouse purposes.

The Waterman Marine Motor Company, Detroit, has acquired a site at Mt. Elliott avenue and Fort street and will soon begin the erection of a new factory building 113 x 120 ft., two stories and of brick construction. The new building will give the company about double its present floor space.

The Farlinger Mfg. Company, Detroit, whose incorporation was recently announced, will occupy the present factory of the Waterman Marine Motor Company upon the completion of the latter's new plant about March 1. The company will manufacture automobile accessories.

The Kessler Detroit Motor Car Company, Detroit, has been incorporated with \$10,000 capital stock to manufacture automobiles and accessories. Among the incorporators are Henry C. Brooks, Jr., and Robert McCormick.

The Deinzer Mfg. Company, Detroit, has been incorporated with \$150,000 capital stock to take over the business of F. Deinzer & Sons, manufacturers of spring beds and mattresses. The business will be gradually enlarged.

To manufacture mechanical medical appliances the Wireless Vibrator Company, Detroit, has been organized with a capital stock of \$10,000. The incorporators are: S. A. Pratt, Hugh Alexander and C. F. Dormont.

The Motorgraph Company, of America, Detroit, has filed articles of incorporation, giving its capital stock as \$500,000. The company proposes to manufacture mechanical advertising devices and other specialties. Everett Bickley, W. F. McDermott and Frank C. Reiley are named as incorporators.

The Detroit Concrete Products Company, Detroit, has been incorporated with \$10,000 capital stock to manufacture cement blocks, etc. Frank C. Evarts and J. H. McIntyre are the principal stockholders.

The Metropolitan Mfg. Company, Detroit, manufacturer of automobile accessories, has increased its capital stock from \$1,000 to \$10,000.

The B. & B. Buggy Company, Marshall, Mich., has increased its capital stock to \$50,000 to provide for expansion of its business.

The J. B. Armstrong Company, Flint, Mich., manufacturer of automobile springs, has begun the erection of two additions to its plant, one 85 x 140 ft. and the other 35 x 100 ft. The new buildings will enable the company to double its capacity.

Arthur Rittenhouse, Cheboygan, Mich., is promoting the establishment of a beet sugar factory at that place.

The taxpayers of Saline, Mich., at a special election, voted to bond for \$30,000 for a waterworks system.

The Lansing Harrow Company, Lansing, Mich., has been incorporated with \$20,000 capital stock to manufacture harrows of a new type. The incorporators include: J. H. Moores, Edward M. Lawson and Thomas MacEwen. The company will have the parts manufactured on contract at present and do only the assembling.

The Reliable Trolley Retriever Company, Flint, Mich., has been organized by James E. Gundry, James Crusoe and others to manufacture a trolley locking device.

The plant and business of the Holmes Machine Company, Sparta, Mich., manufacturer of gasoline engines, has been sold to the Hercules Buggy Company, Evansville, Ind. The new owner will continue the operation of the plant.

The West Michigan Furniture Company, Holland, Mich., has begun the construction of a considerable addition to its plant to be used for dry kiln purposes.

The Warner-Douglas Company, Bronson, Mich., maker of sheet metal stampings, is planning to largely increase the capacity of its plant.

## Birmingham

BIRMINGHAM, ALA., December 2, 1912.

L. L. Stephenson, Birmingham, has had plans prepared for the rebuilding of his brick plant at Lovick, recently destroyed by fire. It will be equipped with brick machinery consisting of a complete stiff-mud outfit of 75,000 daily capacity, to be dried with waste heat from kilns. No power equipment will be required, as it will operate on purchased electric current.

Application has been made at Mobile, Ala., for a charter for the Adams Machinery & Mfg. Company, with a capital stock of \$30,000, to manufacture and deal

in lumber and machinery. W. J. Adams is president; Ashbel Hubbard and L. G. Adams are also interested.

The Kyomei Coal Company, Birmingham, Ala., has been chartered to develop coal mines in Bibb County, by H. W. and T. B. Perry and others. Its capital stock is \$50,000, of which \$42,500 is paid in.

The Georgia Mattress Company, Athens, Ga., contemplates establishing a branch factory at Savannah. H. T. Hinton and J. D. Dudley are interested.

Pensacola, Fla., will vote December 30 on the issuance of \$100,000 of bonds for establishing a lighting plant.

The Monroe Lumber Company, Monroeville, Ala., contemplates establishing an ice factory and an electric plant.

An ice factory with a daily capacity of 30 tons will be established at Elberton, Ga., by the Atlantic Ice & Coal Corporation of Atlanta.

A proposition has been made for the establishment of a glass works at Haleyville, Ala., and a committee of citizens in co-operation with the mayor is examining sites.

It is announced at Waycross, Ga., that C. C. Buchanan will organize a company with a capital stock of \$50,000 to operate a fertilizer plant, ginnery and grist mill.

The Dixie Fertilizer Company, Dublin, Ga., has been chartered by W. S. Phillips, W. B. Rice, A. W. Garrett, A. W. Smith and others. Contracts for buildings have been awarded and a portion of the machinery is ordered. It is expected to begin operations in January.

A fertilizer factory will be established at Blakeley, Ga., by W. W. Beard and J. E. Peterson, president of Union Savings Bank, Fort Gaines, Fla. A portion of the machinery has been purchased.

Application has been made at Tifton, Ga., for the incorporation of the Georgia Sawmill Company, with a capital stock of \$1000, to operate saw and shingle mills. W. W. and J. W. Wall and S. C. Prim incorporators.

A stove mill may be established at Jasper, Ala., by J. C. Turbeville.

Application has been made at Tampa for the incorporation of the Standard Scale & Fixture Company to manufacture fixtures, scales, etc. S. M. Reager is president and W. A. Joughlin is secretary and treasurer.

It is announced at Valdosta, Ga., that the American Chemical Company, Toledo, Ohio, will establish a plant for the refining of products of pine, stumps and wastes of pine. It is stated that \$300,000 to \$500,000 is to be invested.

The Boaz Cotton Oil Mills, Boaz, Ala., contemplates building a \$50,000 oil mill in Gadsden, Ala.

## The Central South

LOUISVILLE, KY., December 3, 1912.

The beginning of the last month of 1912 sees no material let-up in the generally improved conditions which have existed for several months. The more conservative attitude of buyers due to the approach of the inventory season may be expected to have its usual effect on the machinery, as on other markets, in a slight reduction of orders during the current month; but the net volume of business is expected to remain above the normal for this season. Manufacturers and branch houses are generally confident of a continuance of good business, and are preparing for a 1913 business, from the start, eclipsing all previous records.

The Fidelity & Columbia Trust Company, Louisville, and the Detroit Chair Company, Detroit, Mich., are conducting negotiations looking toward the erection of a chair factory in this city employing about 200 men, a site already having been determined upon.

The Henry Vogt Machine Company, Louisville, Ky., has recently sold a number of its ice and refrigerating machines for location at various Kentucky and other Southern points, among which are the following: Louisville City Hospital, 20-ton refrigerating; Consumers' Ice Company, Tampa, Fla., 50-ton refrigerating; J. M. Leach, Kokomo, Ind., 40-ton ice; C. C. Henderson, Greenville, Ala., 20-ton refrigerating; Purity Ice & Bottling Company, Wagoner, Okla., 30-ton ice; Marin Ice & Cold Storage Company, Marion, O., 50-ton ice; Sid. M. Cafiero, Algiers, La., 20-ton ice; Arcadia Light, Ice & Telephone Company, Arcadia, Fla., 25-ton ice. Several of these machines carried with them orders for power equipment.

The Chess & Wymond Company, Louisville, intends to purchase two steam log skidders, which will be used in the development of the company's timber properties near Holly Ridge, La.



The J. V. Pilcher Mfg. Company, Louisville, which manufactures sheet metal specialties, is considering the enlargement of its plant in the spring.

The Damon Mfg. Company, Bowling Green, Ky., is specializing on the manufacture of a complete flour-milling outfit, built in one frame, ready for connection with power of any description. The company plans to erect a larger plant near Bowling Green, in order to manufacture the outfit on a more ambitious scale.

Elkhorn City, Pike County, Ky., is to be the site of large car and machine shops of the Carolina, Clinchfield & Ohio Railroad, 40 acres of ground having been purchased by the company for that purpose.

H. T. Hopkins, Sharpsburg, Ky., has purchased of M. V. Bostain the site of the recently burned mill owned by the latter at that place, and is erecting a new flour mill.

Black & Co., Barbourville, Ky., desire to purchase woodworking machinery for use in the manufacture of spokes, handles, single-trees and neck yokes. They will require about six turning lathes.

N. Burks, Horse Cave, Ky., is in the market for tobacco prizing machinery and equipment, power, machinery and presses.

Van Cleve & Moss, Horse Cave, Ky., want prices on equipment for tobacco prizing, including scales, presses, etc.

The Farmers' Union Mill, J. N. Camden, Versailles, Ky., president, will equip at that place a flouring mill of 100 barrels' capacity. The company has purchased a three-story building in which to place its machinery.

The recently organized Fort Bros. Foundry Company, Nashville, Tenn., has leased a building at Church street and Thirteenth avenue, in that city, and will operate a foundry with a daily capacity of eight tons. James B. Fort is president, Frank Foster, secretary-treasurer, and Louis N. Fort, vice-president.

The contract for the erection at Knoxville, Tenn., of the addition to the plant of the Brookside Mills has been let to the Sullivan & McNally Company, Paterson, N. J., and work has been begun. Large additional equipment of spindles, looms and power machinery will be required. F. P. Sheldon & Son, Providence, R. I., are the architects.

The John J. Duncan Company, Knoxville, Tenn., desires to purchase for immediate shipment a 125 or 150-hp. locomotive boiler, second-hand, and a Scotch marine or Economic boiler.

W. B. Bell, New Castle, Pa., is reported to have under consideration plans for the establishment of a plant at Memphis, Tenn., for the manufacture of iron cotton ties, or hoops.

The Aycock Hosiery Company, South Pittsburg, Tenn., is completing the erection of a large addition to its mills at that point, and is ready to purchase machinery.

The Volunteer State Mineral Company, Nashville, Tenn., has been organized with a capital stock of \$50,000 to operate the tripoli deposits near Bristol, Tenn.-Va., in the manufacture of polish. Dr. I. Steinberg, of Nashville, manager, will be at Bristol shortly to receive bids for tripoli reduction, grinding and bolting machinery. The other officers of the company are S. L. Hudson, Smyrna, Tenn., president; Edward B. Tucker, vice-president; E. C. Holloway, secretary-treasurer.

The Old Hickory Mfg. Company, Clarksville, Tenn., J. O. Fly, manager, which will operate a plant for the manufacture of clothing, wants prices on a 100-hp. boiler, a 75-hp. engine, an elevator for a four-story brick building, and dryroom equipment.

The Klaren Mfg. Company, Fort Wayne, Ind., wants prices on woodworking machinery.

The West Virginia Pulp & Paper Company, Cass, W. Va., wants prices on a Model 51 Marion steam shovel.

The plant of the H. G. Williams Cooperage Company, Leslie, Ark., has been destroyed by fire with a loss of \$300,000. The plant was one of the largest of its kind in the world, and will probably be rebuilt.

The George Mau-Hannemann Company, Garrett street, Atlanta, Ga., desires to purchase a boiler for use in its bakery.

Clifford Orr, Dever Building, Yazoo City, Miss., is organizing a company for the manufacture of a patented cotton press. Herbert L. Beeler, Cincinnati, O., is in charge of the engineering work in connection with the proposed company, which will be known as the Orr Mfg. Company. It will require all sorts of metal work-

ing and machine-tool equipment and considerable power machinery, including drills, cranes, milling machines, an engine lathe, etc.

The Stanton Foundry & Machinery Company, Palatka, Fla., desires to purchase a five-ton foundry crane, new or second-hand.

The Gibbes Machinery Company, Columbia, S. C., is erecting its plant, and will proceed with the purchase of its equipment, under plans by J. B. Urquhart, Columbia. The plant includes a foundry, machine shop, automobile repair shop, warehouses and office building.

The Commissioners of Public Works of Camden, S. C., will receive proposals until December 19 for the building of a waterworks and electric light plant. The plant will include an auxiliary and main pump station, steam and electric pumps, 300-hp. boiler plant, 1,000,000-gal. filter plant, reservoir, generators, complete lighting system, and about three miles of 10 and 12-in. pipe.

The Jewel Cotton Mills, Thomasville, N. C., want a second-hand two to three-hp. electric motor, 550 volts, three-phase, 60 cycle, 1800 revolutions.

The Morrison Company, Inc., has taken over the business of the Morrison Machine & Supply Company, of which Hackley Morrison was proprietor, Richmond, Va. The officers of the new company are: Ware B. Gay, president and treasurer; Hackley Morrison, vice-president; J. H. Hanselman, secretary. A new plant is being constructed, to be ready in the spring, housed in a reinforced concrete building 60 x 160 ft., one story. The company is in the market for an electric crane and a 50-kw. steam-electric generator. Additional machinery will be needed in the spring. The principal business is fabricating wrought iron pipe, manufacturing nipples, and dealing in pipe valves, fittings, etc.

The Denmark Machine Works Company has been incorporated with \$20,000 capital stock to take over the business of the Denmark Machine Works, Denmark, S. C. The company is making additions to the plant to accommodate the manufacture of the Aerocycle, an athletic apparatus for children, and is now in the market for a turret lathe, 20 in. swing; engine lathe, 15 to 16 in. swing; pattern makers' lathe, 16 to 18 in. swing; light shaper and planer and a grinding machine. The officers of the company are W. J. Platt, president; Lewis Blount, vice-president and manager, and T. B. Wilkinson, secretary-treasurer.

A vegetable canning factory, designed to employ from 100 to 150 people, is being planned at Whitesburg, Ky., by Samuel T. Webb, Vanceburg, Ky.

The Nashville Creamery & Mfg. Company, organized at Nashville with a capital stock of \$30,000, will at once install a complete plant for the manufacture of butter and by-products. Horace M. Vise is general manager and W. J. Reeves is secretary and treasurer.

## St. Louis

St. Louis, Mo., December 2, 1912.

The machine tool market continues rather quiet, though there is a noticeable increase in the inquiries. The aggregate, however, is not up to recent conditions and dealers are of the opinion that the present state of affairs will continue at least until the first of the coming year.

The Strong-Robinson Electric Company, St. Louis, has been incorporated by E. B. and R. H. Robinson and M. P. Ellis to manufacture electrical apparatus. Plant plans have been withheld.

The National Roofing Company, St. Louis, has acquired a site on the western city limits and will construct new buildings and install equipment.

The Monsanto Chemical Works, St. Louis, has bought considerable adjoining property to cover contemplated expansion of the plant, details for which are withheld.

The National Cone Mfg. Company, St. Louis, has been incorporated with \$16,000 capital stock by Albert Weber and Herman and Hans B. Meyer to do a general manufacturing business.

The International Gas Condensing Company, St. Louis, has been organized with \$9,000 capital stock by Herman Duhme, Jr., Conn Grable and Clarence L. Miller to refine oils, manufacture gases, etc.

The Kriz Specialty Company, St. Louis, has been incorporated with \$10,000 capital stock by William Kriz, Hugh Wright and Albert Renard to undertake a general specialty manufacturing business.

The Interstate Sash & Door Company, Kansas City,

has been incorporated with \$20,000 capital stock by S. and Paul J. Leidigh and George B. Bosworth to equip a sash and door manufacturing plant.

The Wagner Electric Mfg. Company, St. Louis, will build an addition to its machine shop to cost \$10,000 exclusive of equipment.

The Oil Fuel Equipment Company, St. Louis, has been incorporated with \$100,000 capital stock by Adolph O. Krieger, Adolph Tachella, Jacques Steiger, O. E. Berchek and J. J. McLean and has plans for the equipment of a plant for the manufacture of oil fuel burning devices.

The Kansas City Gas Mantle Company, Kansas City, Mo., with \$10,000 capital stock, has been incorporated by T. H. Beckman, John Shea, Harvey E. Hartz and Henry Steubenreich to manufacture gas mantles.

The Jeddick Mining Company, Joplin, Mo., has been incorporated with \$60,000 capital stock by Dan Miller, William Clendening, Henry Arnold and J. B. and J. H. Durkee to equip and operate mineral lands controlled by them.

Battle & Co., chemists, have prepared plans for the construction of a plant equipped for increased capacity in St. Louis to take the place of the one now occupied.

T. J. Spragin & Son, of Fenwick, Miss., have plans for the construction of a mill at Bude, Miss., with a capacity of 25,000 ft. of hardwood lumber per day.

The Lovejoy Planing Mill Company, Kansas City, Mo., with \$20,000 capital stock, has been incorporated by Cecil E. Lovejoy, Thomas W. Nelson and C. Edgar Lovejoy.

The cooperage plant of the H. G. Williams Cooperage Company, Leslie, Ark., was burned November 28 with an estimated loss of \$300,000 on buildings, machinery and stock. The plant was one of the largest of its kind in the world. Future plans have not been announced.

The National Gas Generator Company, Kansas City, Mo., with \$50,000 capital stock, has been incorporated by Lewis Alverson and Charles and C. E. Andrews for the manufacture of a gas generating device.

The American Veneer Company, with a capital stock of \$50,000, has plans for the improvement of the plant of the American Panel & Lumber Company at Newport, Ark., which it has purchased.

The city of Biloxi, Miss., has plans for adding to the electrical equipment at its waterworks plant.

The Louisiana Traction & Power Company, Lafayette, La., recently incorporated with \$250,000 capital, has plans for the construction of a power plant in connection with proposed electric railways.

The Arkansas Cold Storage Company, of Little Rock, Ark., is equipping its power house with two turbines of 1000-kw. capacity, generators, boilers, etc. Edward Cornish is president and C. E. Ross engineer in charge.

The Commissioners of the Water and Light Improvement District of McGehee, Desha County, Ark., will open bids December 16 for furnishing materials and equipment for the construction of a complete water supply and electric light system.

## Texas

AUSTIN, TEXAS, November 30, 1912.

Dealers of machinery and tools report that the month of November has been an exceptionally good one for their trade and indications point to a continuation of existing favorable conditions.

The Jefferson Light & Ice Company has been organized at Jefferson with a capital stock of \$30,000. The incorporators are J. C. Driskell, M. W. Driskell and M. N. Benefield, all of Jefferson.

The taxpayers of the northwestern part of Galveston County have formed a drainage district to embrace 7500 acres of land and have issued \$31,900 bonds for the purpose of constructing drainage canals and ditches.

The Dallas Foundry, Dallas, has been organized for the purpose of establishing an iron foundry. The incorporators are E. Rynearson, W. F. Wesson and H. Holston, all of Dallas.

Robert Alley, of Hale Center, and associates will install a number of irrigation pumping plants upon wells which they will bore upon a large tract of land near there. More than \$100,000 will be expended in the proposed improvements, it is stated.

John A. Barbay, of Crescent, La., and associates, will establish a large brick manufacturing plant at Port Arthur, Texas, in connection with a cement and sand industry they are also preparing to establish.

Ball Bros. will install a large factory at Wichita Falls, for the manufacture of fruit jars. They have

secured a site of 30 acres for the proposed plant.

J. P. Kearby is promoting the establishment at Comanche, of a plant for the manufacture of glass. Large quantities of sand are being shipped from Comanche to glass manufacturing concerns in other parts of the country.

The Trinity River Irrigation District, of which J. E. Broussard is president, will soon begin the construction of an extensive irrigation system near Anahuac, for which \$125,000 in bonds was recently issued.

The Galveston Ice & Cold Storage Company is installing an ice and cold storage plant at Galveston at a cost of about \$200,000.

The People's Ice Company has begun the erection of an ice plant at Wichita Falls, which will cost approximately \$100,000.

Extensive improvements are to be made to waterworks plant and distributing system of Big Springs. Bonds to the amount of \$50,000 have been issued for that purpose and for street improvements.

The St. Louis, Brownsville & Mexico Railroad is installing a repair shop at Kingsville. It will be equipped with a large amount of modern machinery.

H. Dittlinger will build an addition to his flour mills at New Braunfels, with a view of increasing the capacity of the plant from 200 to 500 barrels per day. Among the machinery requirements will be a 275-hp. Diesel crude oil engine.

T. W. Norton has purchased a large granite quarry 18 miles from Llano, and is preparing to install machinery for quarrying the stone.

John R. Cullinana, of St. Louis, Mo., and associates are promoting the construction of an interurban electric railway that is to run between Denison, Texas, and Durant, Okla. The proposed line will be about 30 miles long. It is stated that the same interests also contemplate installing a hydroelectric plant at some point on the Red River and the construction of power transmission lines to Durant, Calero, Colbert, Okla., and Denison, Texas.

The City Council of Nuevo Laredo, Mexico, has awarded the contract for the installation of a waterworks plant and construction of a distributing system and sewer system for that city to El Compania Ferrera of Monterey, Mexico, for \$150,000, Mexican currency.

The Federal Government of Mexico has awarded the contract for the construction of extensive harbor works at the port of Payo Obispo, in the territory of Quintana Rue, to Jose Cintora of Mexico City, at a cost of \$2,000,000.

The Federal Government of Mexico has accepted the bid of S. Pearson & Son, Ltd., of Mexico City, for the construction of harbor improvements at Coatzacoalcas. The proposed work will cost in excess of \$1,000,000, it is stated.

The Mexican Pacific Company has been awarded the contract by the Federal Government of Mexico for extensive improvements of the harbor at Zihuatanejo, State of Guerrero, at a cost of about \$2,000,000. The company has its headquarters at Seattle, Wash.

The Mexican Mines, Ltd., of El Oro, State of Mexico, Mexico, has applied to the Federal Department of Fomento, of Mexico, for a concession to use the water of the Los Ocotes arroyo for the generation of electric power. The company will install a hydroelectric plant and use the power which is obtained therefrom for the operation of the machinery of its mines at El Oro.

The City Council of Nuevo Laredo, Mexico, has received bids from a number of contractors for the installation of a water works plant and construction of a distributing system. The cost of the proposed improvement will be approximately \$500,000. The bids have not yet been acted upon.

Paul Ginther of Santa Rosalia, Chihuahua, Mexico, and associates have adopted plans for the construction of a 2000-ton cyanide mill that will be erected near Parral. The site for the proposed plant has been selected and application has been made to the government for a concession for the enterprise.

The American Milling Company is erecting a flour mill and elevator at Agua Prieta, Sonora, Mexico.

## The Pacific Coast

PORTLAND, ORE., November 26, 1912.

The machine tool market shows no marked change, though the total volume of small orders is perhaps a little greater. The amount of repair work and new construction in connection with the lumber industry is unusually large and a good many of the larger shops are finding it necessary to buy single tools either to in-



crease their capacity or to replace old equipment, though as far as possible orders are being held back until the turn of the year. Automobile and general repair shops also are constantly in the market for small lathes and shapers. Few sales are of much consequence individually.

Notwithstanding the curtailment of logging operations by winter weather the demand for equipment, including engines and boilers, locomotives and improved log handling devices, is unusually active. Throughout Oregon and Washington mills and logging camps are being improved, and extensive overhauling will be done during the winter shutdown at most of the plants. A number of complete new plants are also in prospect. Handlers of canning machinery are preparing for an extremely active business with the Alaska packers, and figures are being prepared on many inquiries from this source. Conditions affecting crops for the coming year have so far been extremely favorable and many plans are under way for development work in the interior.

The Portland Cordage Company has completed arrangements for establishing a large factory in the Philippines.

The Hawley Pulp & Paper Company, Oregon City, Ore., has about completed plans for extensive improvements, intending to increase the variety of its output.

The Coos Bay Pulp & Paper Company, Marshfield, Ore., is getting in a lot of heavy machinery from San Francisco.

The Klamath Falls Tub & Pail Company, Klamath Falls, Ore., announces plans to quadruple its present output.

The Berger & Carter Company, San Francisco, Cal., which handles and controls patents on some important lines of canning machinery, has opened a branch office at Seattle, Wash., to look after the salmon canning business on Puget Sound. H. C. Daniels is in charge.

The Puget Sound Machinery Depot, Seattle, Wash., is having plans drawn for a two-story addition to its factory. This company is preparing to open a branch office at Vancouver, B. C.

The Port of Portland Commission has just taken figures on a 24-in. swing lathe, a pipe machine, a 24 x 24-in. planing machine and drill press for installation at its drydock, St. Johns, Ore.

The St. Helens, Ore., Shipbuilding Company has just taken contracts for a 118-ft. towboat and a 130-ft. barge.

Ward Bros., manufacturers of doors and cabinets, have purchased a site near this city, where they expect to erect a factory at once.

The Falls City Lumber Company has about completed arrangements to install a new mill at Independence, Ore.

The town of Puyallup, Wash., is considering the installation of a municipal light and power plant.

The Hammond Lumber Company is about to start work on improvements to its plant at Astoria, Ore., involving some construction work and a number of new machines.

The Washington Mill Company, Spokane, Wash., has plans under consideration for the installation of a large amount of new machinery this winter.

The C. A. Smith Lumber Company has plans drawn for a new shingle mill in connection with its large plant at Marshfield, Ore.

The Craig shipbuilding plant, Long Beach, Cal., has contracts booked for construction next year amounting to about \$1,000,000, and to accommodate the increasing business plans to lengthen its drydock from 300 to 450 ft.

## Canada

TORONTO, ONT., November 30, 1912.

The foundry plant of Steel & Radiation, Ltd., St. Catharines, Ont., was formally opened November 29 by Sir Henry Pellatt, Toronto, who is president, the Lieutenant-Governor, Sir John Gibson, being present. Two hundred men are employed at the new plant. Six hundred are to be employed when the works are completed. The site is a 37-acre tract on the Welland Canal.

Shops are to be built for the Canadian Northern Railway Company at Seaside, a Toronto suburb. The company's land commissioner announces that a Montreal firm, engaged in the manufacture of iron and steel products, has acquired a location at Seaside and will erect a plant there. It is to employ 300 people at the outset and a larger number in the early future.

The Atlantic Sugar Refineries, Ltd., of Montreal, has been incorporated, with a capital stock of \$10,000,000.

The Mond Nickel Company, Victoria Mines, Ont., is putting up a large smelter.

The Dominion Nickel Company will build a large smelter in northern Ontario. M. J. O'Brien, Renfrew, Ont., and J. R. Booth, Ottawa, are prominent in the new company.

The Riordon Paper Mills, Montreal, which has plants at Hawkesbury and Merriton, Ont., proposes to build an exceptionally large plant at Cobalt, the cost to be about \$3,000,000. The financial arrangements are understood to be completed.

The Canadian Pacific Railway Company is making additions to its shops in West Toronto.

S. F. Bowser & Co. are building a factory in West Toronto, the cost to be \$35,000.

The Eisendrath Glove Company, of Chicago, has decided to establish a Canadian branch in London, Ont.

The Chapin Auto Cycle Company will erect a factory in Brantford, Ont., and employ 150 men.

The hub and spoke factory of Longhead Bros., Ltd., at Sarnia, Ont., was destroyed by fire November 28. The loss is estimated at \$100,000.

Plans are being prepared for the erection in Toronto of one of the largest artificial ice plants in Canada, the cost to be \$3,000,000. The syndicate is the same as that whose plants in Montreal and Winnipeg are nearly completed.

It is expected that the Independent Tire Company will have its plant at Guelph, Ont., in operation at the beginning of the year.

The Spanish River Pulp & Paper Company, Espanola, Ont., is building an additional paper mill equal in capacity to the large one it is operating. Its output will thus be raised to 200 tons per day. The order for the machinery will be a very important one.

The Sydenham Glass Company, Ltd., Wallaceburg, Ont., will add two extensive buildings to its plant, with equipment, doubling its present capacity.

The Tudhope Automobile Mfg. Company, Windsor, Ont., the Canadian auxiliary of the Everitt Motor Company, of Detroit, will build next spring, on a 10-acre site recently acquired at Windsor, a manufacturing plant which will cost with equipment about \$100,000.

The Ontario Power Company, Niagara Falls, Ont., is completing plans for adding new equipment to its power plant under the Canadian brink of the falls.

The Chadwick Brass Company, Ltd., Hamilton, Ont., will build a foundry for the manufacture of brass, aluminum and bronze castings.

The Campbell Steel & Iron Company, Ltd., Ottawa, will build a \$40,000 factory on Carlin avenue, that city, for which new machinery will be required.

It is planned to spend \$2,000,000 on shops for the Canadian Northern Railway Company in the Middle West, at some point between the city of Winnipeg and the Pacific coast. Saskatoon is mentioned as the probable location.

Fire destroyed the power house and sluice gates of the Dryden Timber & Pulp Company at Dryden, Ont., November 28. The loss will reach \$100,000.

F. A. Barton and C. F. Schaub, of Calgary, Alberta, are making inquiry as to the conditions for establishing a wrapping paper plant at Medicine Hat, Alberta.

Several large industrial concerns have signed agreements to establish manufacturing industries in Fort William, Ont., within one year, and the total number of men to be employed by the combined industries will be nearly 2000, which will mean an increase in population within the next year of about 10,000 people. A list of the new industries that Fort William has secured this year is as follows:

Canada Car & Foundry Company (plant value, \$1,500,000, employing 1200 men); Hutton Starch Works (plant value \$500,000, employing 200 people); McKellar Bending Company (plant value \$150,000, employing 100 men); National Tube Company (plant value \$400,000, employing 150 men); Great Western Wire Fence Company (plant value \$100,000, employing 100 men). In addition to these, Fort William has the following manufacturers already established: Canada Iron Corporation, Copp Stove Company, Seaman-Kent Company, Ltd., Ogilvie Flour Mills Company, Fort William Coalotte Company, Fort William Broom Company, Kakabeka Falls Brewing Company, Alsip Brick & Tile Company, Pigeon River Lumber Company, Piper Brick Company, Fort William Brass Foundry, and various others.

The Northwest Brass Foundry Company, Ltd., has decided to locate a manufacturing establishment in Calgary, Alta., which will be one of the important industries of the city. The plant will cost \$300,000 to

start with and will afford employment to 500 men immediately upon its completion.

Thomas A. Black, of Winnipeg, president of the Great West Wire Fence Company, says that company will have its Fort William plant in operation before the spring.

The grain growers are proceeding to build a large flour mill in New Westminster, B. C.

## Government Purchases

WASHINGTON, D. C., December 2, 1912.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids December 14 for two 75-k.v.a. steam driven alternating current generating sets and switchboard to be delivered to Brooklyn.

The Mississippi River Commission, Room 20, Custom House, Memphis, Tenn., will open bids December 23 for furnishing turbines, pumping sets, hot well, feed water heater and electric light plant for hydraulic grader No. 1205.

The Paymaster General, Navy Department, Washington, will open bids December 10 under schedule 4980 for one open-type combined feed water heater and meter and December 23 under schedule 4998, class 21, for two 75-in. boring and turning lathes.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids November 26 under schedule 4933 as follows:

Class 61, one 54 x 54 in. x 10 ft. planing machine—Bidder 45, Detrick & Harvey Machine Company, Baltimore, Md., \$4,708; 70, Garvin Machine Company, New York, \$4,852; 87, Kemp Machinery Company, Baltimore, Md., \$5,476, \$5,620 \$4,833 and \$4,725; 112, Niles-Bement-Pond Company, New York, \$4,925, \$5,170, \$5,350.

Class 62, two horizontal boring, drilling and milling machines—Bidder 112, Niles-Bement-Pond Company, New York, \$7,200 and \$7,000.

Class 63, six reversible and 26 non-reversible drills—Bidder 30, Chicago Pneumatic Tool Company, New York, \$1,670; 31, Cleveland Pneumatic Tool Company, Cleveland, Ohio, \$1,288, part; 78, Independent Pneumatic Tool Company, Chicago, Ill., \$1,690; 79, Ingersoll-Rand Company, New York, \$1,838.

Schedule 4934, class 64, three one hp. 110 volt direct current shunt wound non-reversible motor and one 10-hp. similar motor—Bidder 40, Diehl Mfg. Company, Elizabethport, N. J., \$395, \$469 and \$410, alternates; 55, Fort Wayne Electric Works, Fort Wayne, Ind., \$395; 56, Fairbanks-Morse Company, New York, \$198.70; 74, Holt Electric Company, Milwaukee, Wis., \$368.10; 124, Reliance Electric & Engineering Company, Cleveland, Ohio, \$590; 167, National Electrical Supply Company, Washington, D. C., \$529.

The supervising architect, Treasury Department, Washington, opened bids November 25 for furnishing new engines, generators, etc., for the United States post office, court house, Chicago, Ill., as follows:

Ridgeway Dynamo & Engine Company, Ridgeway, Pa., \$41,500; Burrows, Ennes & Kirkpatrick, Chicago, Ill., \$40,000; Griscom-Russell Company, New York, \$36,792; A. L. Ide Sons, Springfield, Ill., \$52,187; Harrisburg Foundry & Machine Works, Harrisburg, Pa., \$42,000; Ball Engine Company, Philadelphia, Pa., \$41,362.

## Trade Publications

**Drop Presses.**—Standard Machinery Company, Providence, R. I. Catalogue. Shows two general lines of drop presses together with the various accessories. These presses are classified under two general heads as plain and automatic and when desired can be made in special styles and sizes. Both styles are used in nearly all branches of metal manufacturing including brass, steel, iron and all of the precious metals, and can also be used for both hot and cold forging and for the shaping of cast steel and cast malleable iron parts. The various styles of presses are illustrated and data on the types of foundations required are given. Mention is also made of some of the other lines made by this company, such as trimming presses and rolling mills.

**Vises.**—Emmert Mfg. Company, Waynesboro, Pa. Catalogue No. 12. Pertains to a line of woodworkers' and pattern makers' universal vises. All of the different styles are illustrated and briefly described and a number of tables of sizes and prices are included.

**Pile Hammers.**—McKiernan-Terry Drill Company, 115 Broadway, New York City. Bulletin. Calls attention to a new and novel accelerating device applied to the company's heavy duty pile hammers which are said to have very few moving parts and strike a greater number of blows for the same weight of piston. The various hammers are illustrated in use for driving wood and steel sheet piling and also concrete piles. Brief specification tables of the different hammers together with line drawings in which the several parts are numbered to facilitate the ordering of repairs are included.

**Metal Cutting Machine.**—Racine Tool & Machine Company, Racine Junction, Wis. Two circulars. Call attention to a high speed metal cutting machine which was illustrated in *The Iron Age*, September 19, 1912, and a three-speed attachment with which all of the company's machines are equipped. The use of this attachment provides three different cutting speeds ranging from 60

to 125 r.p.m., so that various kinds of material can be cut at the most efficient speeds.

**Fuel Oil Burning System and Reducing Valves.**—Schutte & Koerting Company, Twelfth and Thompson streets, Philadelphia, Pa. Two catalogues. The first which is section O, of catalogue 6, refers to the Koerting mechanical oil burning system where the oil is forced by pumps through superheaters to the burners. After a brief description of the system, a number of installations in marine and stationary plants are illustrated and briefly described. Section R of catalogue 6, gives general descriptions and specifications for the Quitette reducing valve which is intended for use in compressed air, water, and high pressure coal gas plants. The text is supplemented by both line and halftone engravings together with a price-list and tables of dimensions.

**Shafting Hanger.**—Janney, Steinmetz & Co., Fourth and Market streets, Philadelphia, Pa. Circular A. Treats of the Dayton inserts which are designed for use in connection with concrete construction when it is desired to provide a means for attaching pipes, machinery, shafting hangers, overhead tram rails, or other parts which must be fastened to walls, ceilings or floors. The insert is adapted to receive the head of a bolt and provides for adjustment to compensate for slight errors in setting of forms. The various types of insert are illustrated with a brief mention of the fields for which they are adapted. An illustrated description of the insert appeared in *The Iron Age*, September 26, 1912.

**Expansion Bolts.**—Brohard Company, Third street and Lehigh avenue, Philadelphia, Pa. Pamphlet. Calls attention to the Climax lag screw shield, screw anchor and toggle bolt, which are intended for fastening into concrete, stone, brick or wood. Their construction is described at some length with illustrations and tables of the various sizes in which they are made. Mention is also made of the other types of expansion bolts made by this company which include hook, eye, hitching ring and brass expansion bolts.

**Gas Engine and Suction Gas Producer.**—Otto Gas Engine Works, Thirty-third and Walnut streets, Philadelphia, Pa. November number of the Otto Cycle. Devoted to a discussion of internal combustion engines in general and the Otto Gas Engine Works product and sales work in particular. Describes a suction gas producer and the engines which are designed for use in connection with it. The text is supplemented by illustrations and data on the comparative cost of fuel and the power developed by the producers are included.

**Turbine Ejector Pumps.**—Fischer-Sweeney Bronze Company, 1302 Clinton street, Hoboken, N. J. Pamphlet. Contains a brief illustrated description of a turbine ejector pump which is designed to be used in connection with vacuum heating systems. The apparatus consists of a motor-driven centrifugal pump, a turbine ejector or vacuum head, a water storage tank and an automatic controlling device, all of which are mounted on a single bed-plate and form a self-contained unit. The advantages of this pump are briefly touched upon and lists giving the range of sizes for air line and return line systems are included.

**Oil Burner.**—Taccella & Krieger, 916 Victoria Building, St. Louis, Mo. Bulletin No. 4. Illustrates and describes the Taccella system of oil burning for street and railroad car heating, fire engines, asphalt kettles and all other isolated heating purposes. The special features claimed for this device are safety, automatic operation, regulation and a low fuel consumption. An illustrated description of this device appeared in *The Iron Age*, September 26, 1912.

**Cooling Towers.**—Edwin Burhorn Company, 71 Wall street, New York City. Catalogue. Points out the advantages of using the Burhorn cooling tower in ice making, refrigerating or cold storage plants. A general description of the tower which is of the louvre type is given, the text being supplemented by numerous illustrations.

**Pipe Joint Repairs.**—Smooth-On Mfg. Company, 572 Communipaw avenue, Jersey City, N. J. Circular. Gives full directions for stopping leaks in screw thread pipe joints by the use of the company's No. 3 iron cement. The text is supplemented by illustrations and a testimonial letter with a view of a repair job is included.

**Time Recording System.**—Sohm Electric Signal & Recording Company, Ravenswood and Berteau avenues, Chicago, Ill. Several circulars. Relate to the various devices of the company which include an elapsed time accumulator and recorder, a time recording lock, an employee's time recorder, time stamps, watchman's boxes, secondary clocks, etc. The first of these devices which electrically accumulates elapsed productive time for use in conjunction with cost systems, was illustrated in *The Iron Age*, September 26, 1912.

**Twist Drills and Small Tools.**—Standard Tool Company, Cleveland, Ohio. Catalogue No. 20. Size, 5 x 7 1/4 in.; pages, 416. Contains lists of all the drills, reamers, milling cutters, taps, etc., which are regularly made by this company and also illustrates many special tools which can be manufactured to order. In general each tool has a page of its own with an illustration at the top and a table of sizes and prices underneath. The last 50 pages of the catalogue are devoted to tables of useful information, a complete telegraphic code and an extensive alphabetical index.



